OIPE JC112 FEB 27 2004 PATENT & TRADEMARK OFFICE

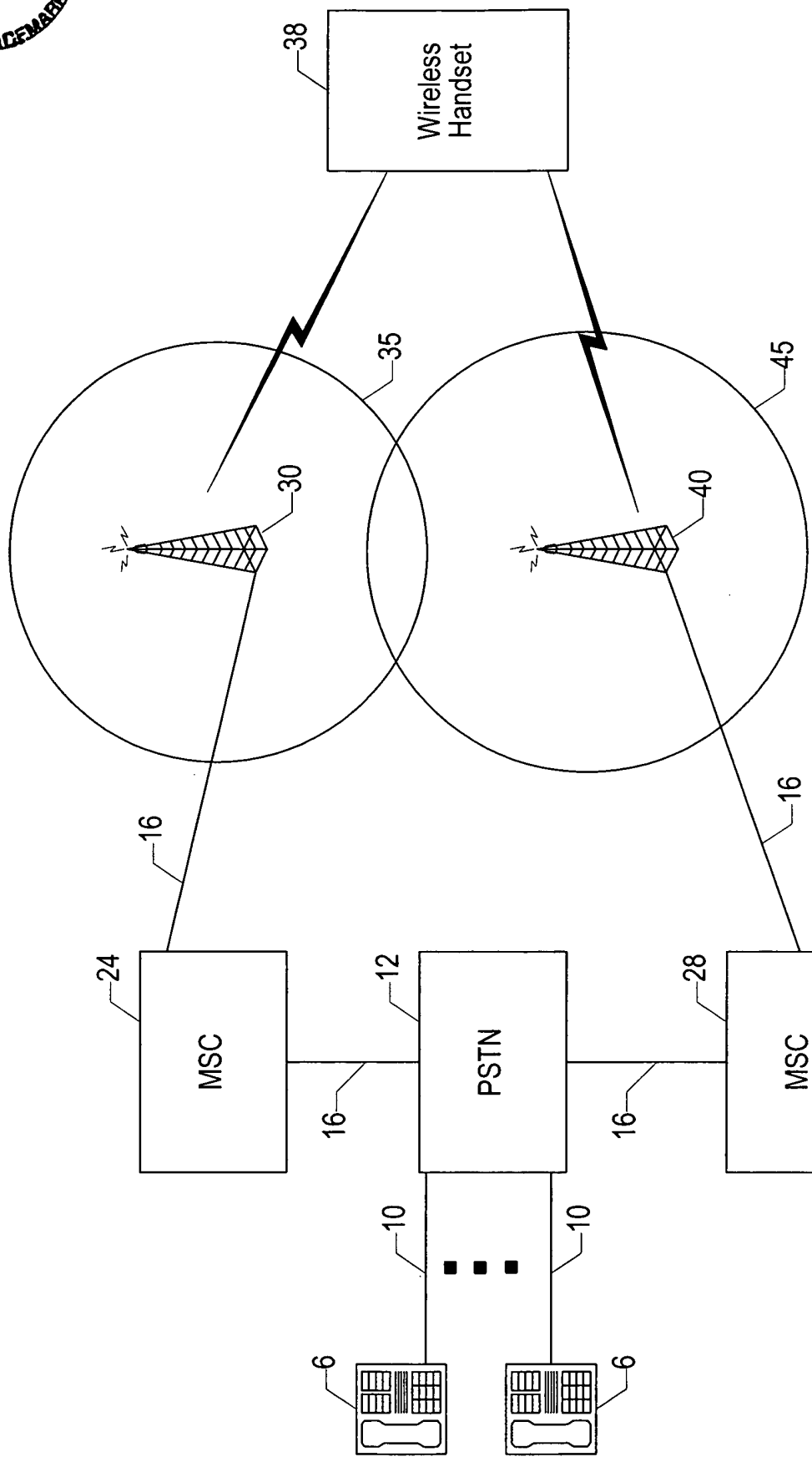


FIG. 1
(PRIOR ART)

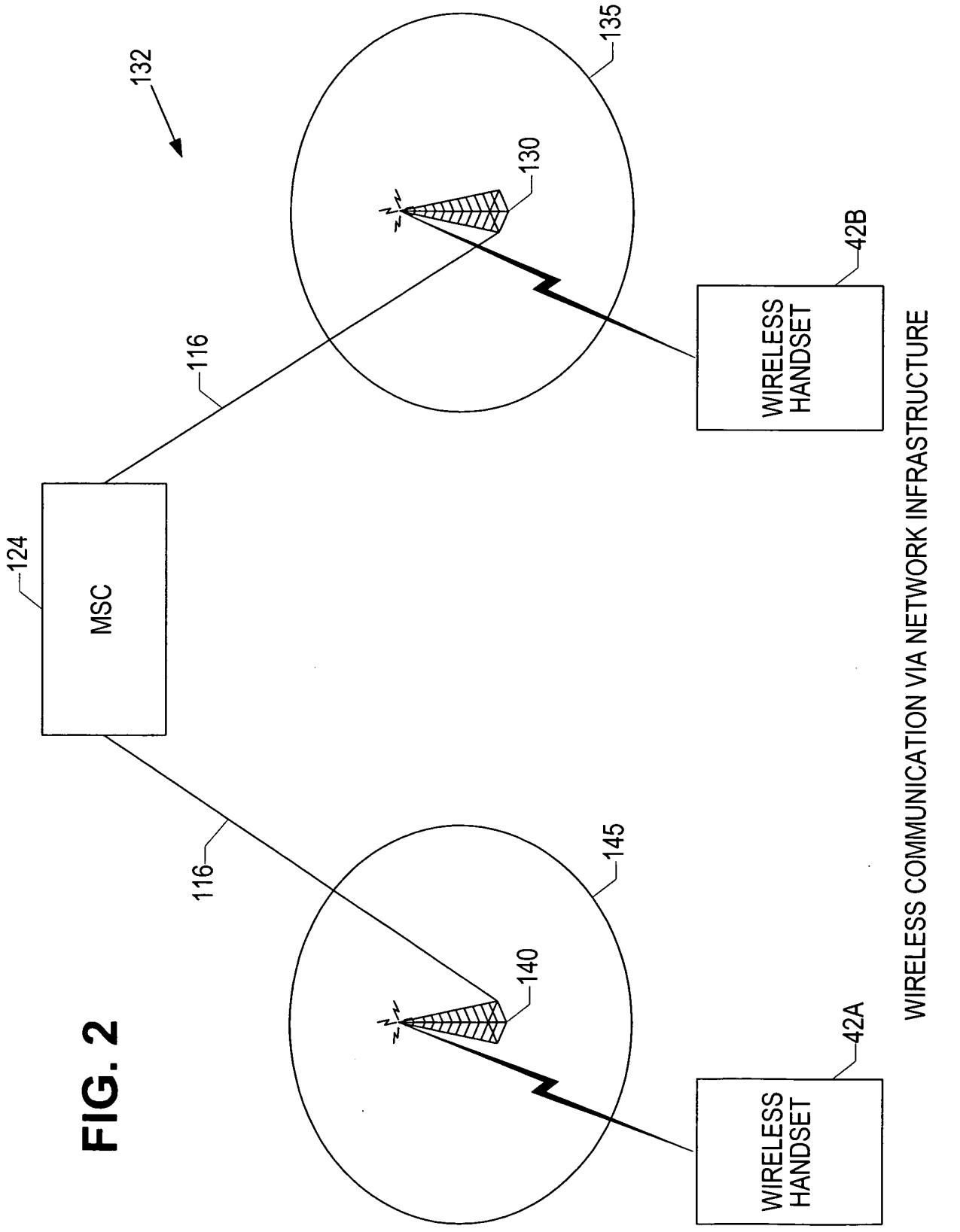

132
135
130
116
124
MSC
116
145
140
WIRELESS HANDSET
42B
WIRELESS HANDSET
42A
WIRELESS COMMUNICATION VIA NETWORK INFRASTRUCTURE

FIG. 2

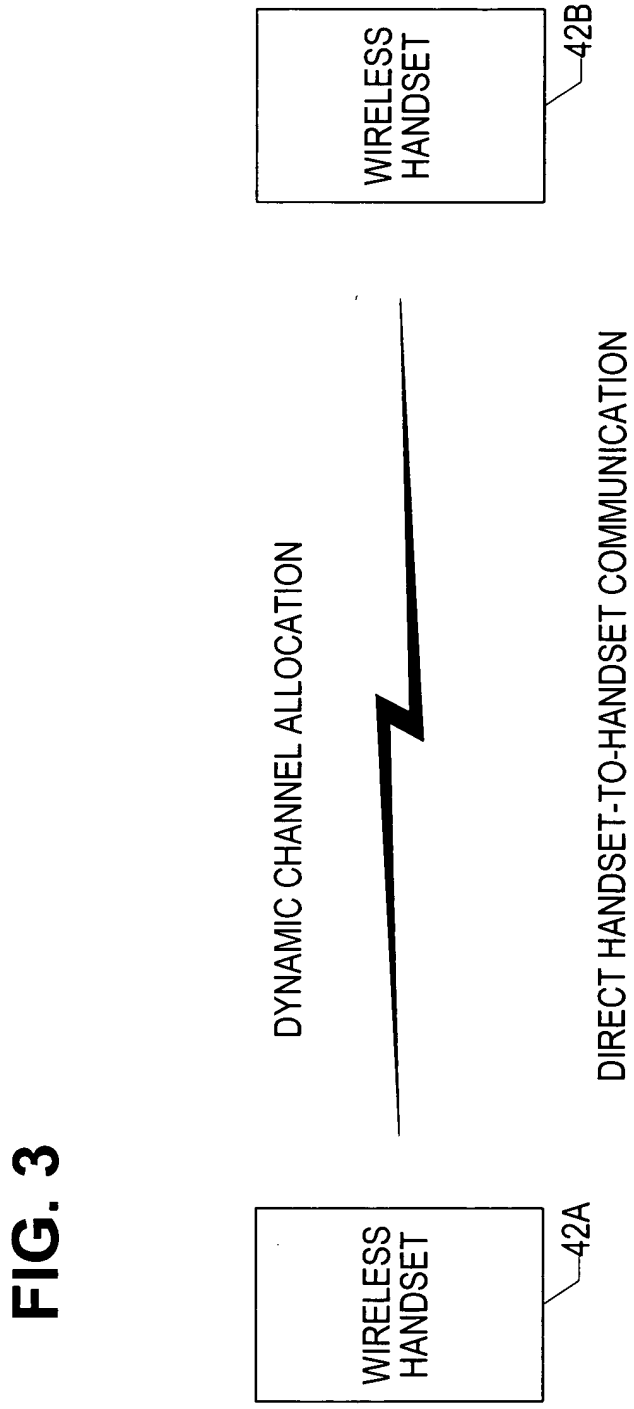
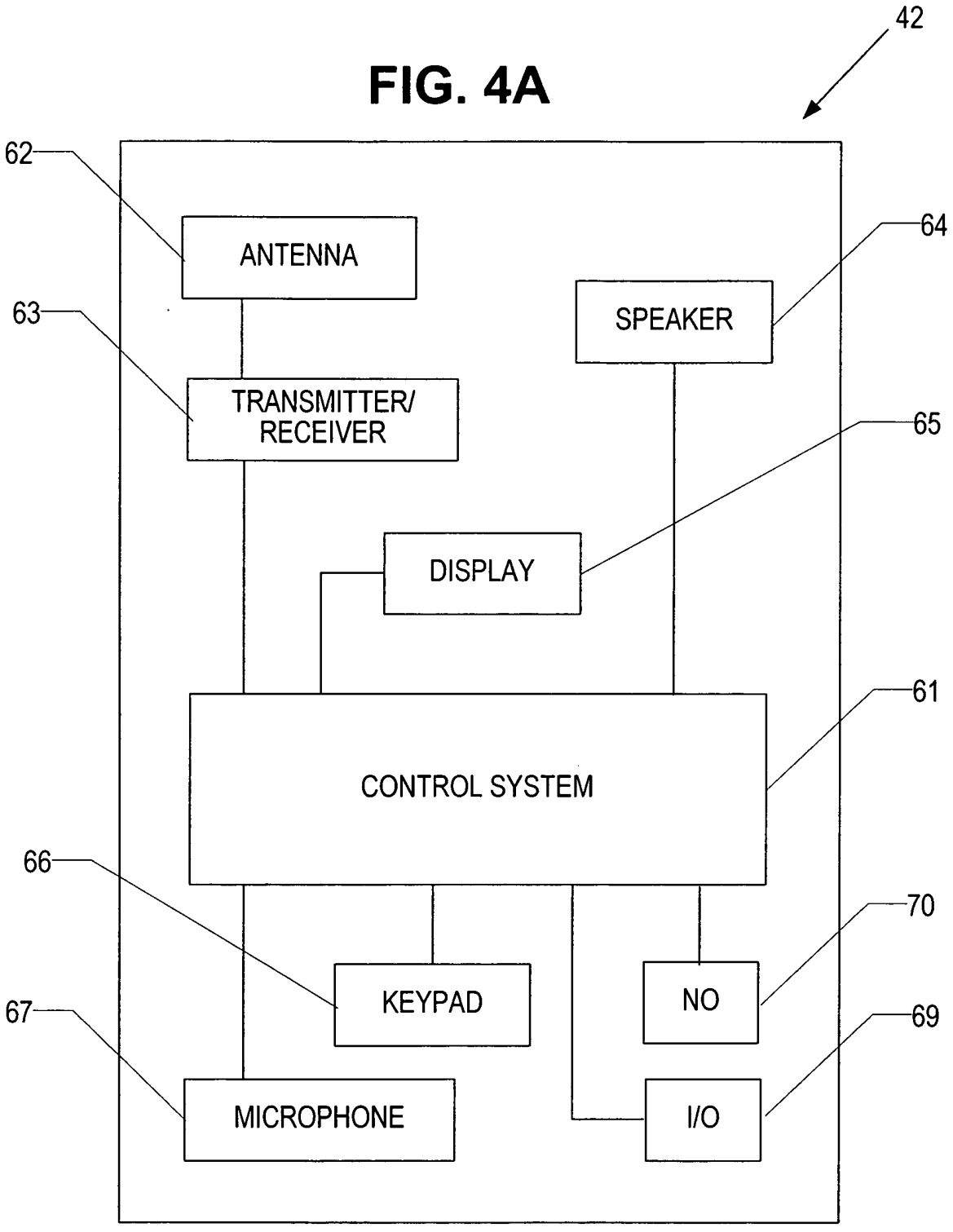

WIRELESS HANDSET
42B
DYNAMIC CHANNEL ALLOCATION
DIRECT HANDSET-TO-HANDSET COMMUNICATION
WIRELESS HANDSET
42A

FIG. 3

FIG. 4A


42
62
ANTENNA
64
SPEAKER
63
TRANSMITTER/
RECEIVER
65
DISPLAY
61
CONTROL SYSTEM
66
70
KEYPAD
NO
67
69
MICROPHONE
I/O

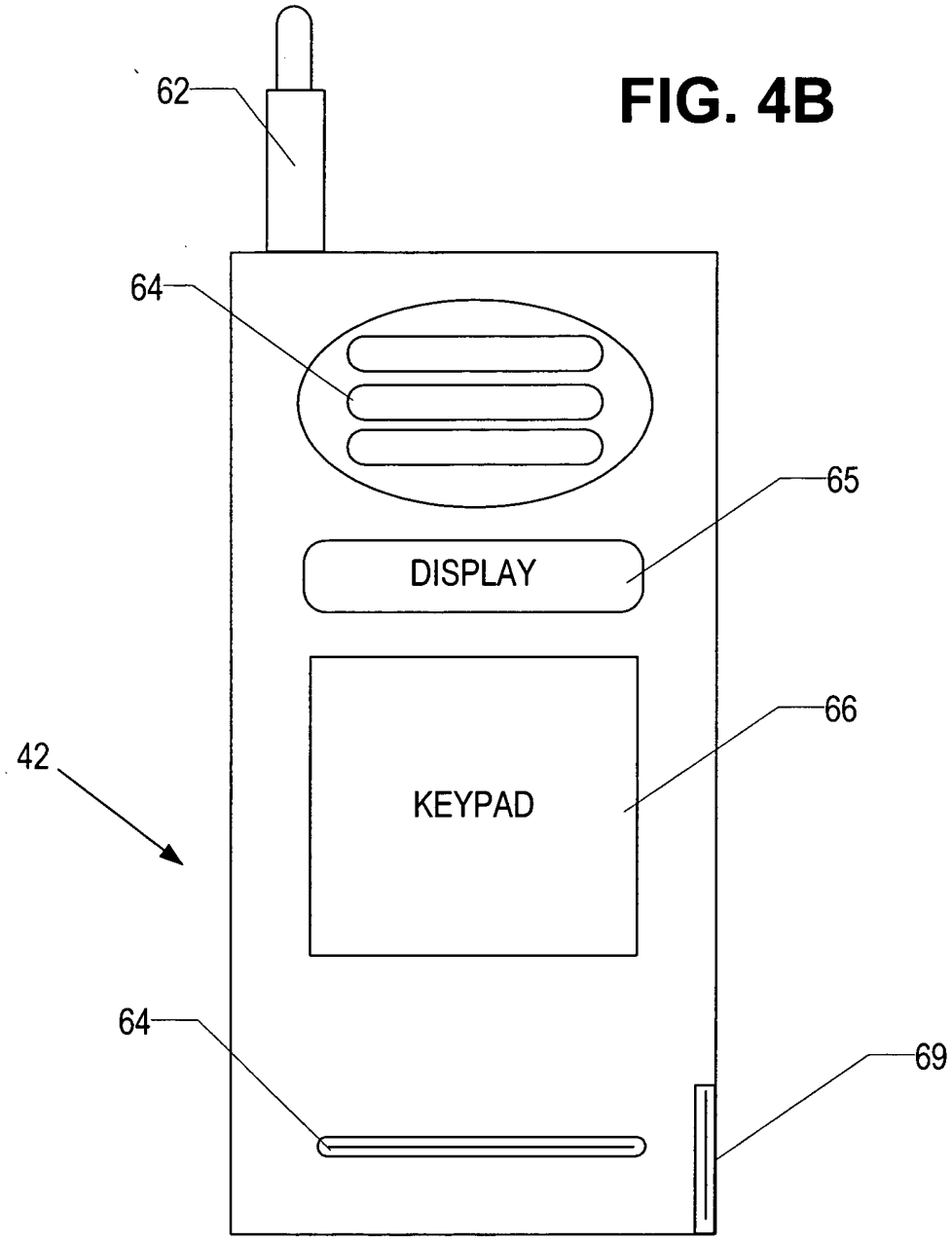
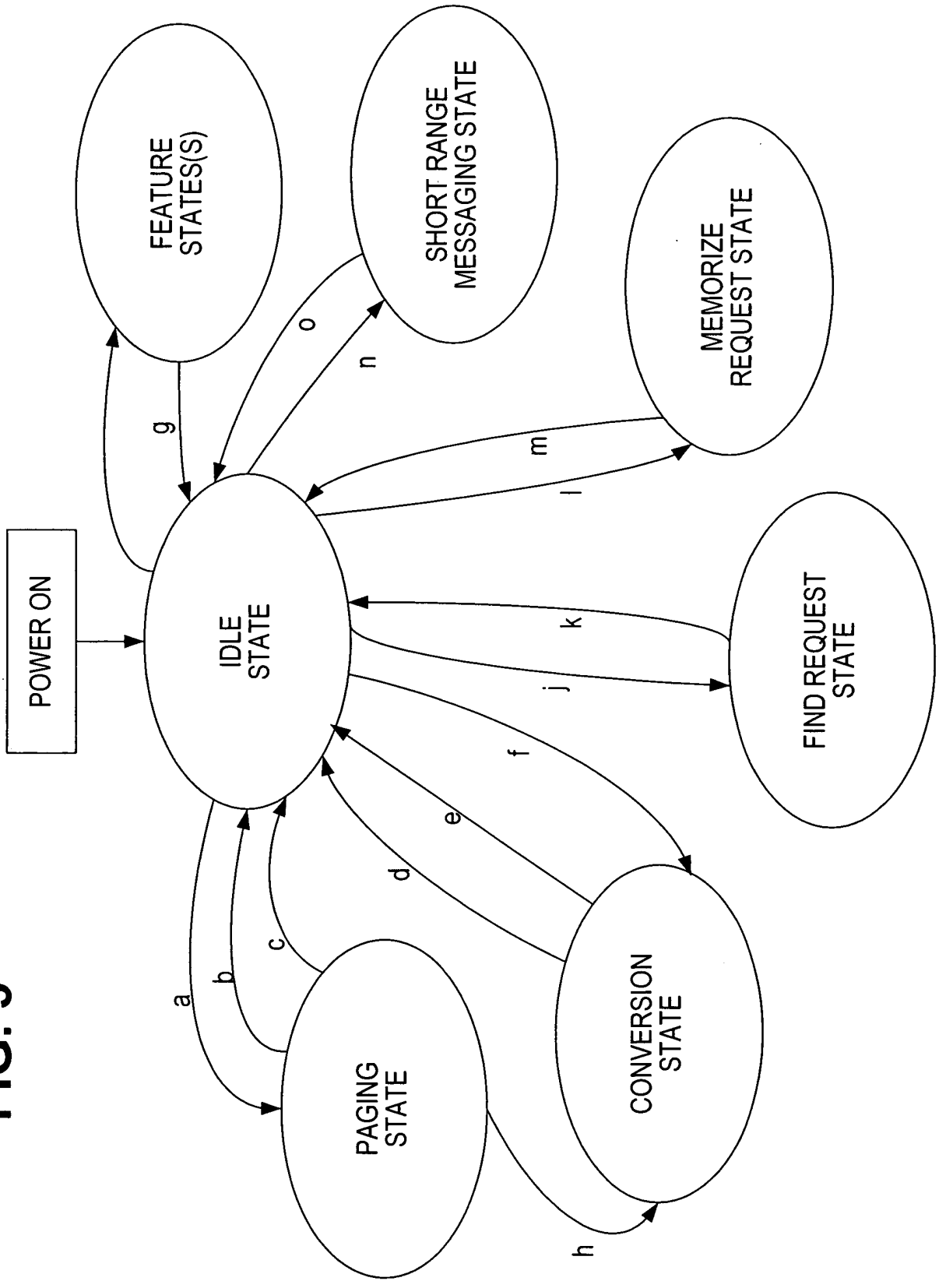


FIG. 4B

FIG. 5


POWER ON
IDLE STATE
FEATURE STATES(S)
SHORT RANGE MESSAGING STATE
MEMORIZE REQUEST STATE
FIND REQUEST STATE
PAGING STATE
CONVERSION STATE
a
b
c
d
e
f
g
h
j
k
l
m
n
o

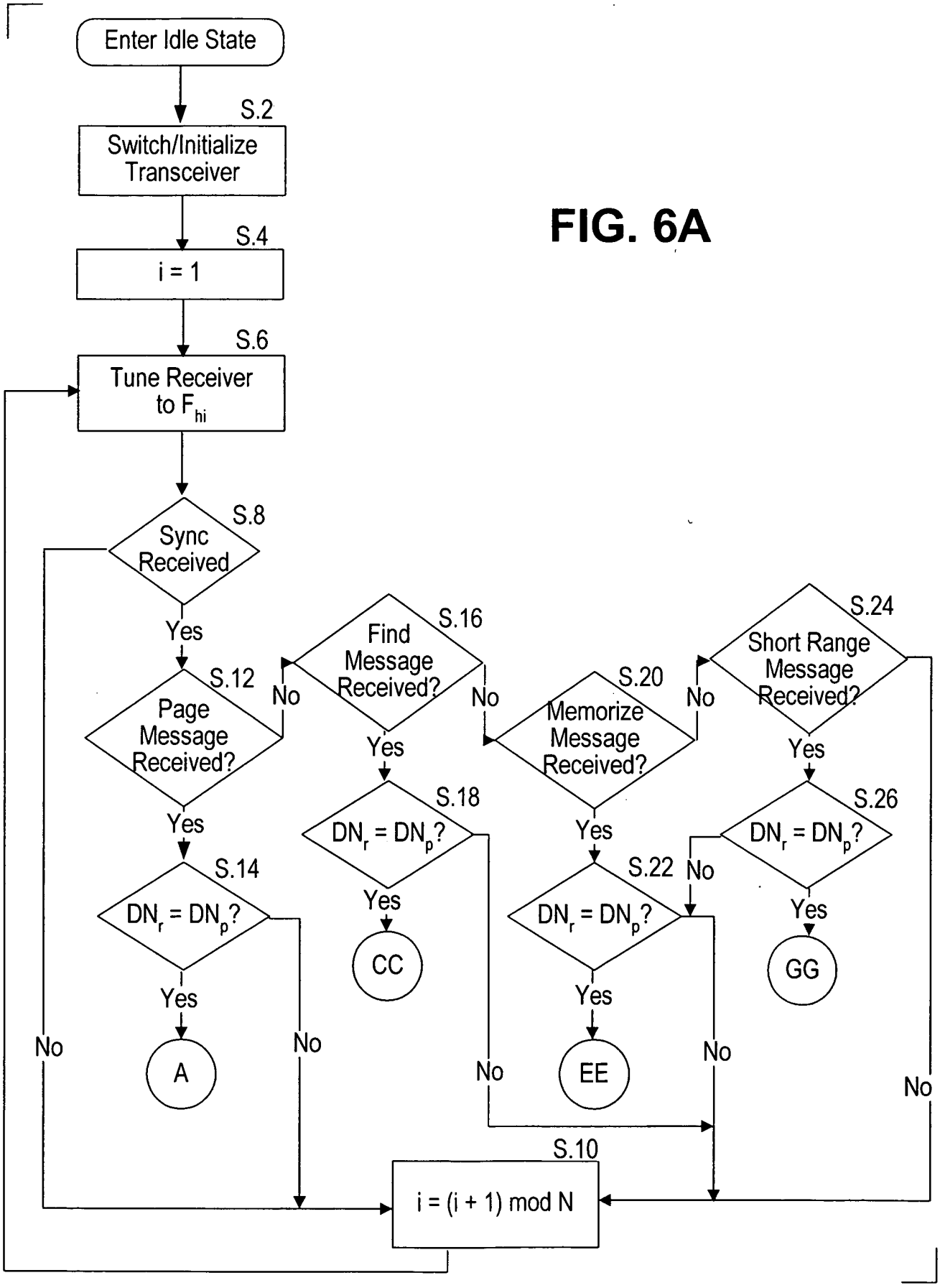

Enter Idle State
S.2
Switch/Initialize Transceiver
S.4
i = 1
S.6
Tune Receiver to F_{hi}
S.8
Sync Received
Yes
No
S.12
Page Message Received?
Yes
No
S.14
$DN_r = DN_p$?
Yes
No
A
S.16
Find Message Received?
Yes
No
S.18
$DN_r = DN_p$?
Yes
No
CC
S.20
Memorize Message Received?
Yes
No
S.22
$DN_r = DN_p$?
Yes
No
EE
S.24
Short Range Message Received?
Yes
No
S.26
$DN_r = DN_p$?
Yes
No
GG
S.10
i = (i + 1) mod N

FIG. 6A

FIG. 6B

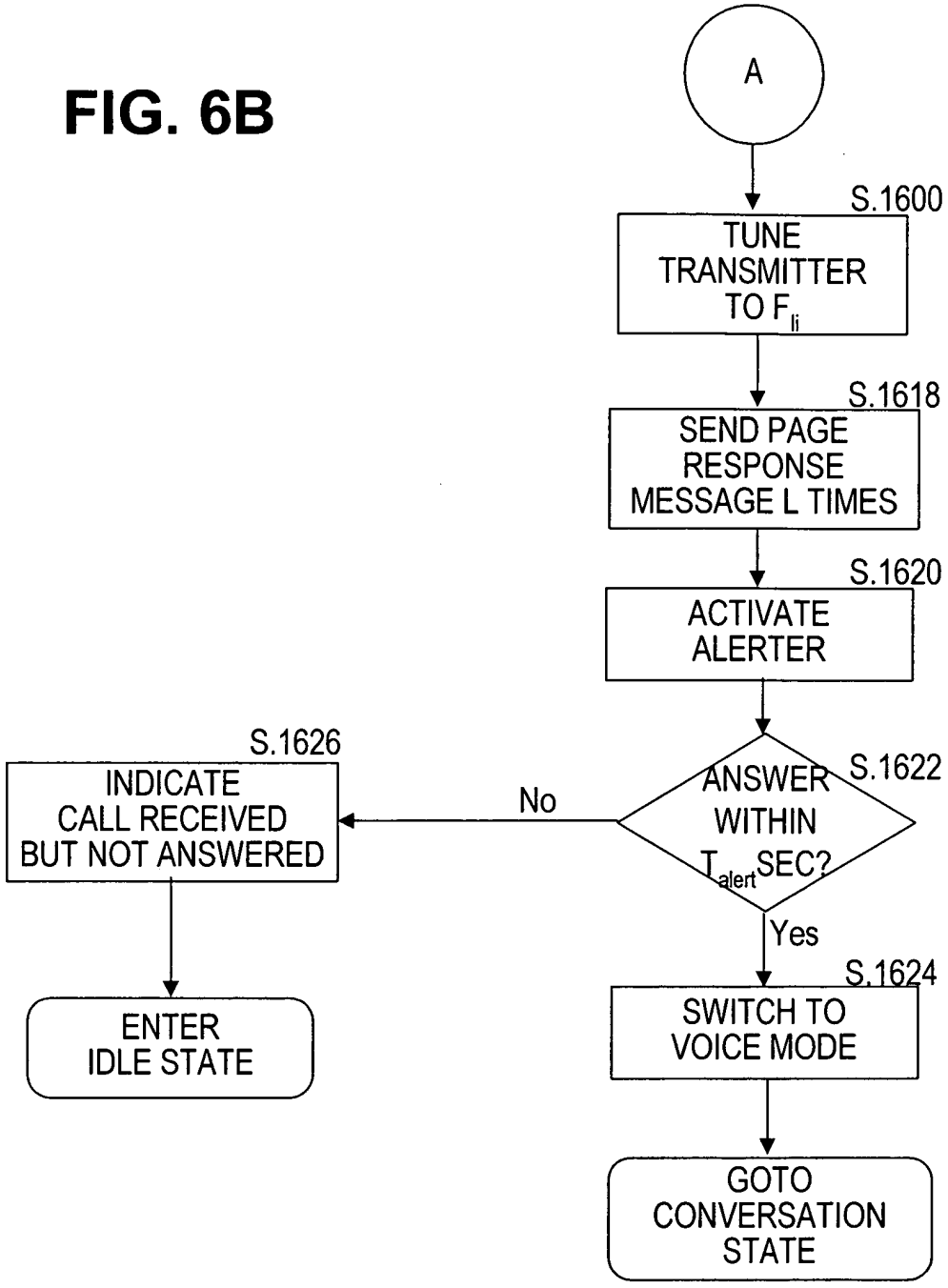
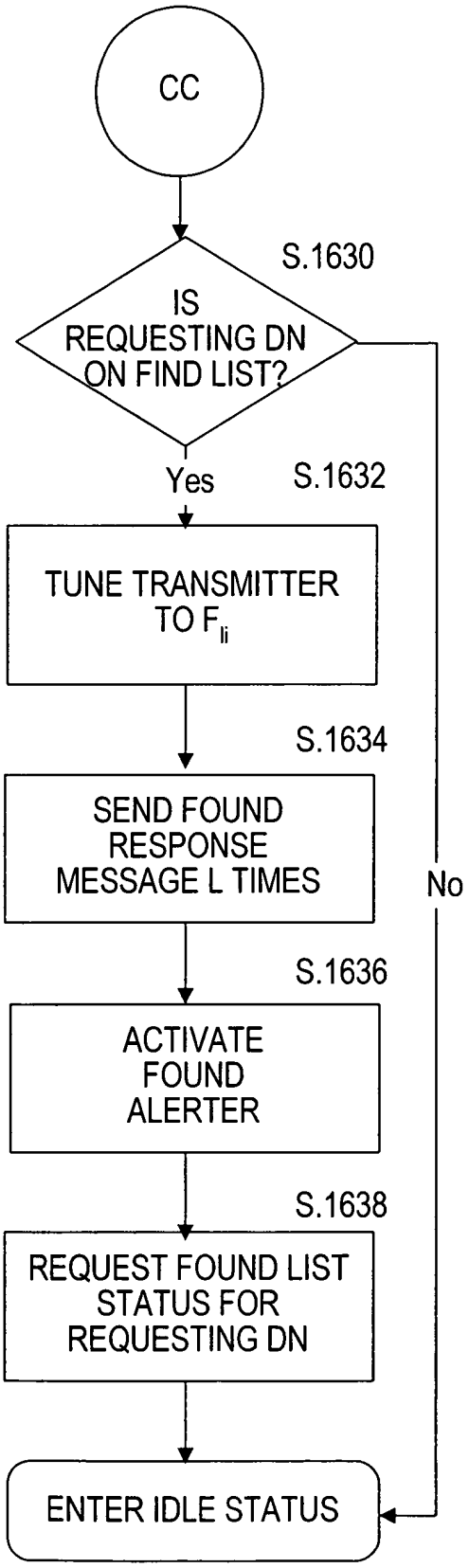

A
S.1600
TUNE TRANSMITTER TO F_{li}
S.1618
SEND PAGE RESPONSE MESSAGE L TIMES
S.1620
ACTIVATE ALERTER
S.1622
ANSWER WITHIN T_{alert} SEC?
No
Yes
S.1626
INDICATE CALL RECEIVED BUT NOT ANSWERED
ENTER IDLE STATE
S.1624
SWITCH TO VOICE MODE
GOTO CONVERSATION STATE

FIG. 6C


CC
S.1630
IS REQUESTING DN ON FIND LIST?
Yes
No
S.1632
TUNE TRANSMITTER TO F_{li}
S.1634
SEND FOUND RESPONSE MESSAGE L TIMES
S.1636
ACTIVATE FOUND ALERTER
S.1638
REQUEST FOUND LIST STATUS FOR REQUESTING DN
ENTER IDLE STATUS

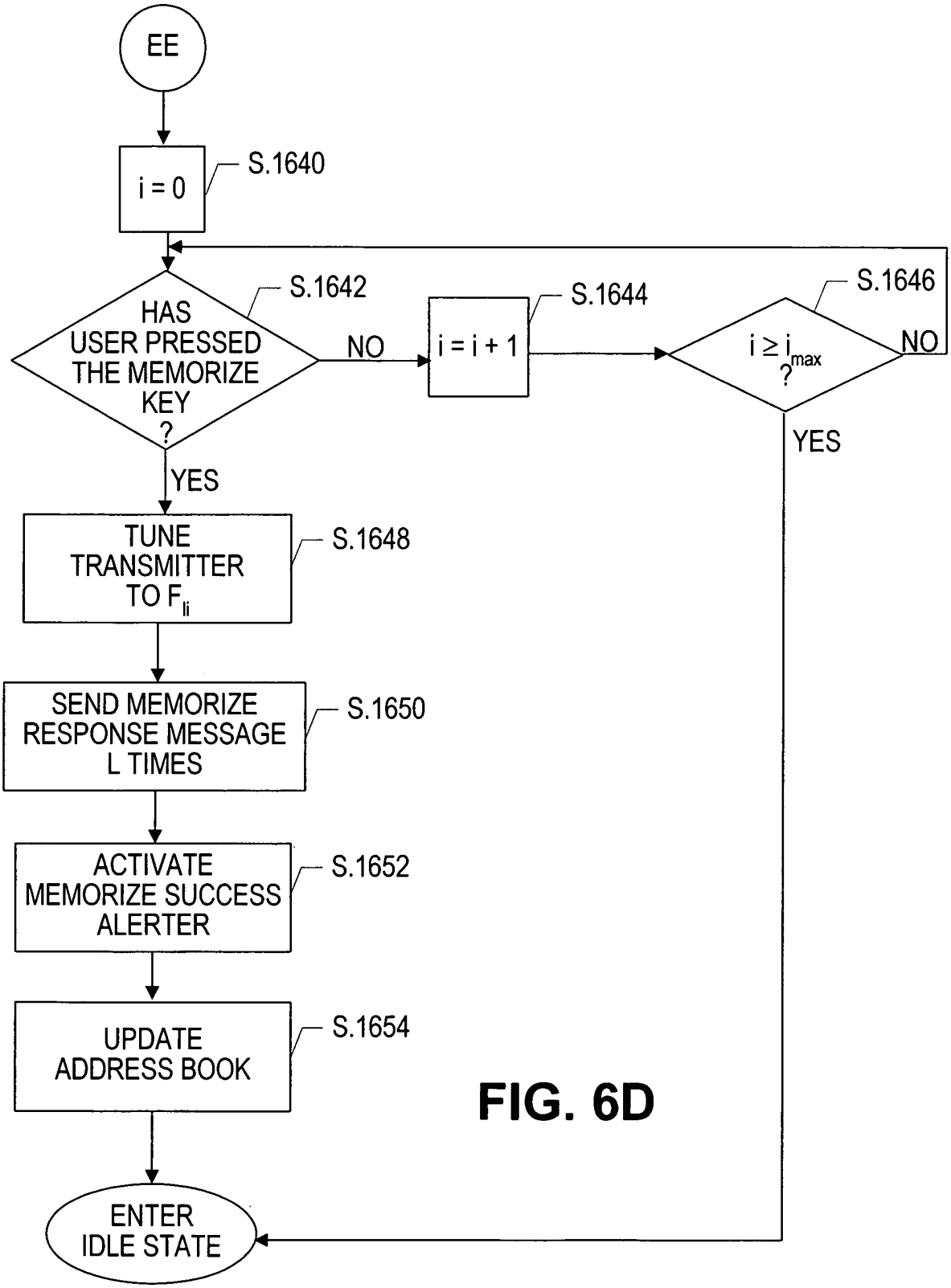

EE
i = 0
S.1640
HAS USER PRESSED THE MEMORIZE KEY ?
S.1642
NO
i = i + 1
S.1644
i ≥ i max ?
S.1646
NO
YES
YES
TUNE TRANSMITTER TO F li
S.1648
SEND MEMORIZE RESPONSE MESSAGE L TIMES
S.1650
ACTIVATE MEMORIZE SUCCESS ALERTER
S.1652
UPDATE ADDRESS BOOK
S.1654
ENTER IDLE STATE

FIG. 6D

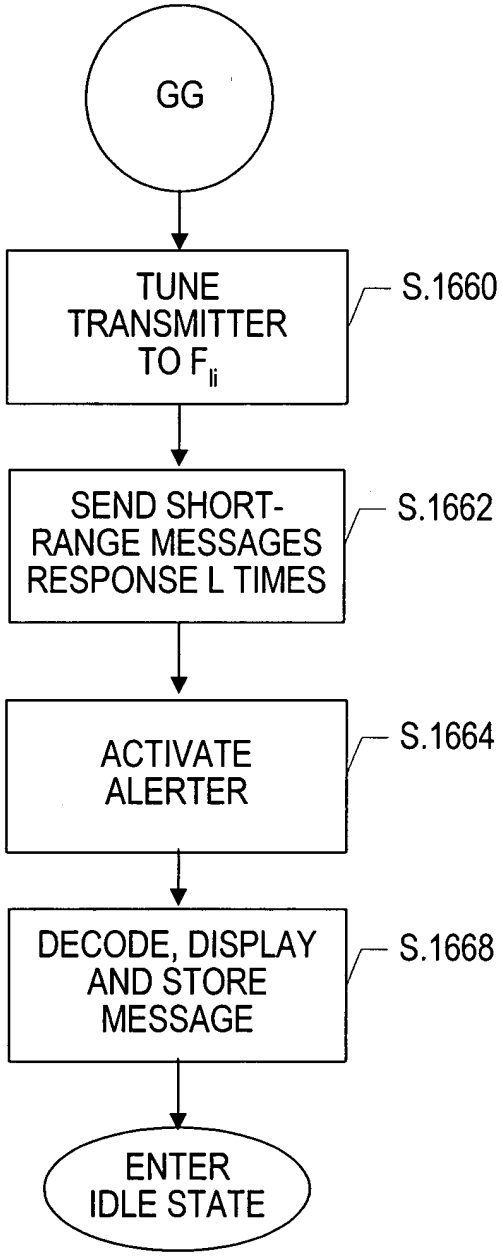
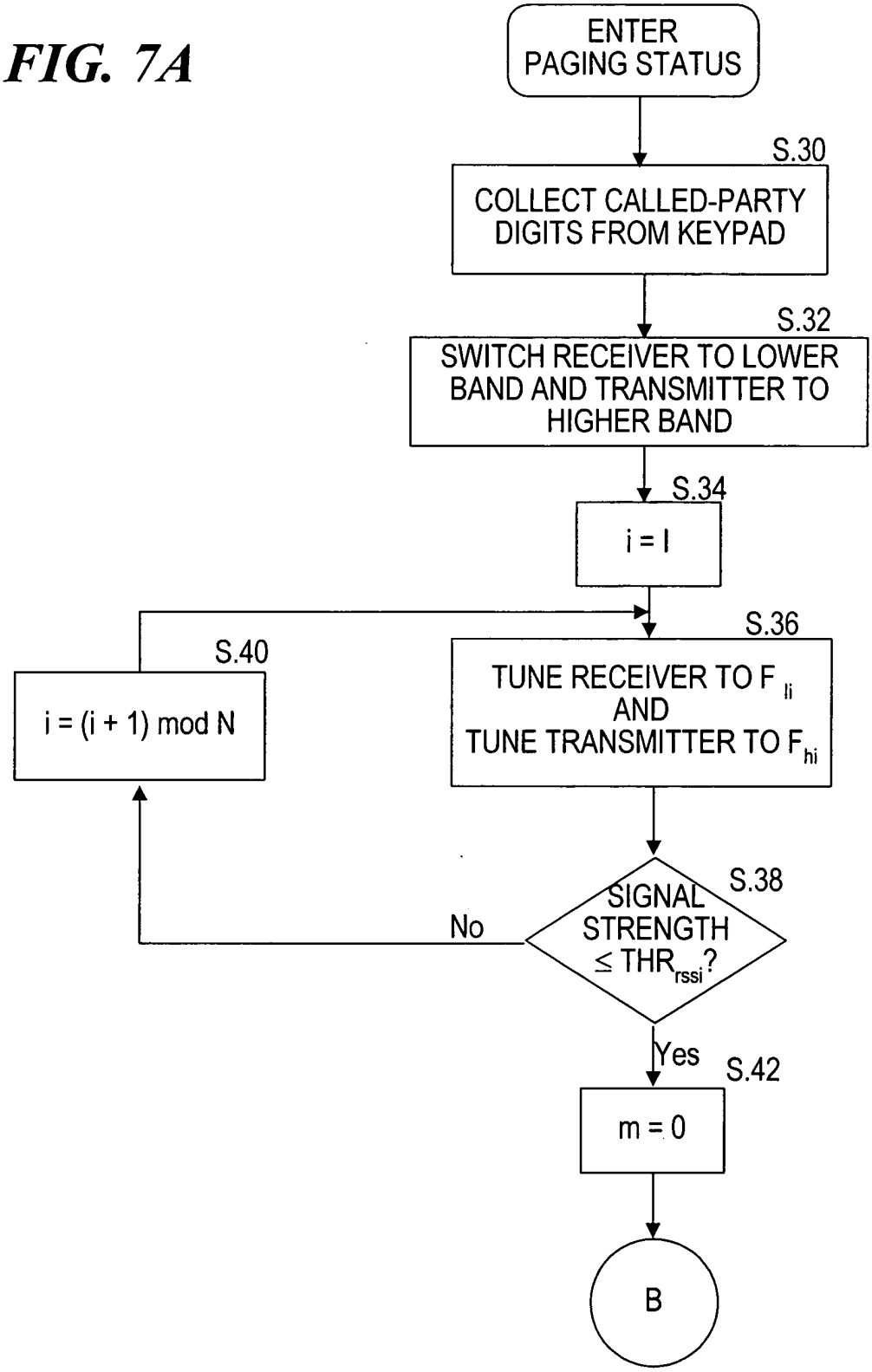

GG
TUNE TRANSMITTER TO F_{li}
S.1660
SEND SHORT-RANGE MESSAGES RESPONSE L TIMES
S.1662
ACTIVATE ALERTER
S.1664
DECODE, DISPLAY AND STORE MESSAGE
S.1668
ENTER IDLE STATE

FIG. 6E

FIG. 7A


ENTER PAGING STATUS
S.30
COLLECT CALLED-PARTY DIGITS FROM KEYPAD
S.32
SWITCH RECEIVER TO LOWER BAND AND TRANSMITTER TO HIGHER BAND
S.34
i = I
S.36
TUNE RECEIVER TO F li AND TUNE TRANSMITTER TO F hi
S.38
SIGNAL STRENGTH ≤ THR rssi ?
No
S.40
i = (i + 1) mod N
Yes
S.42
m = 0
B

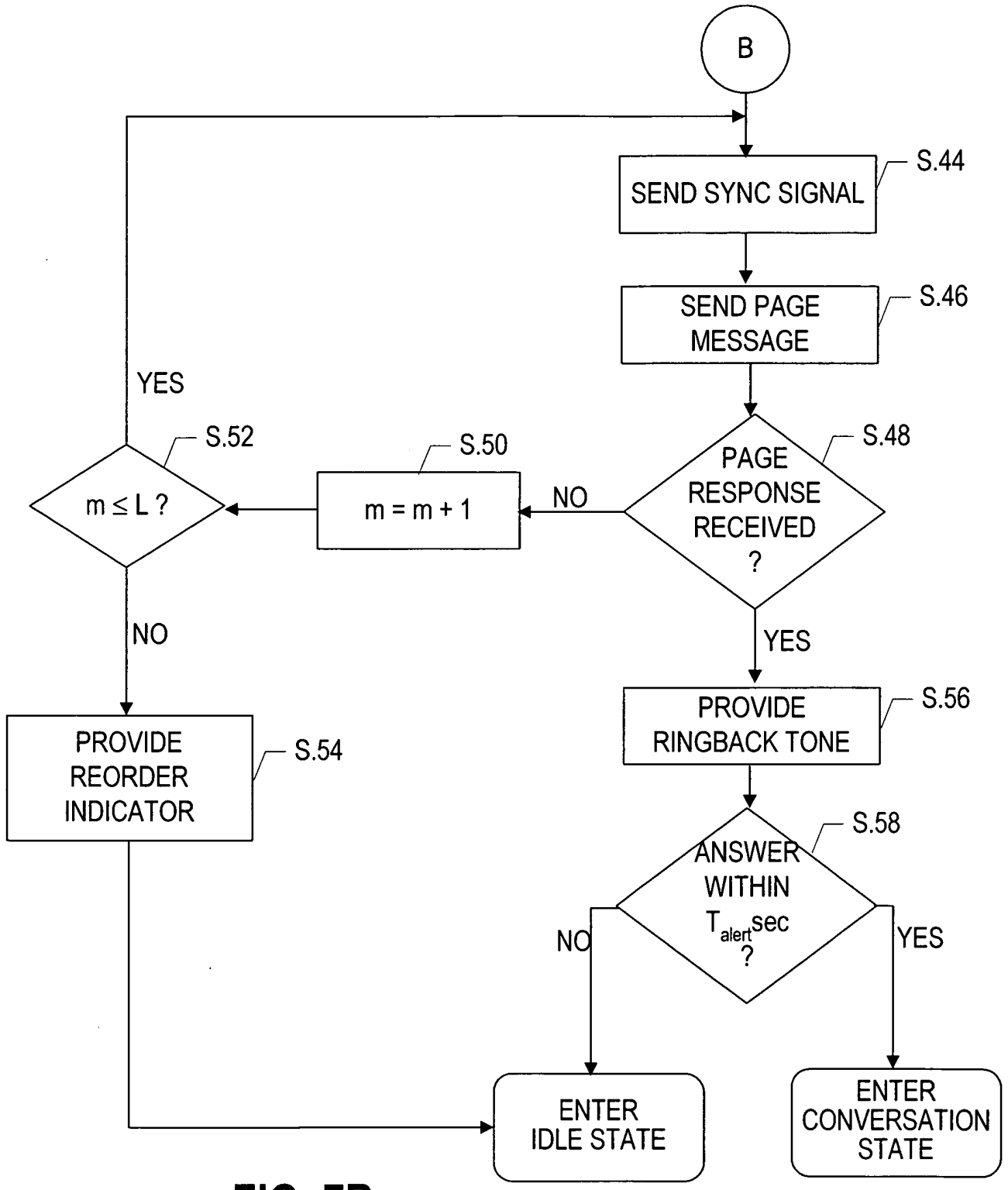
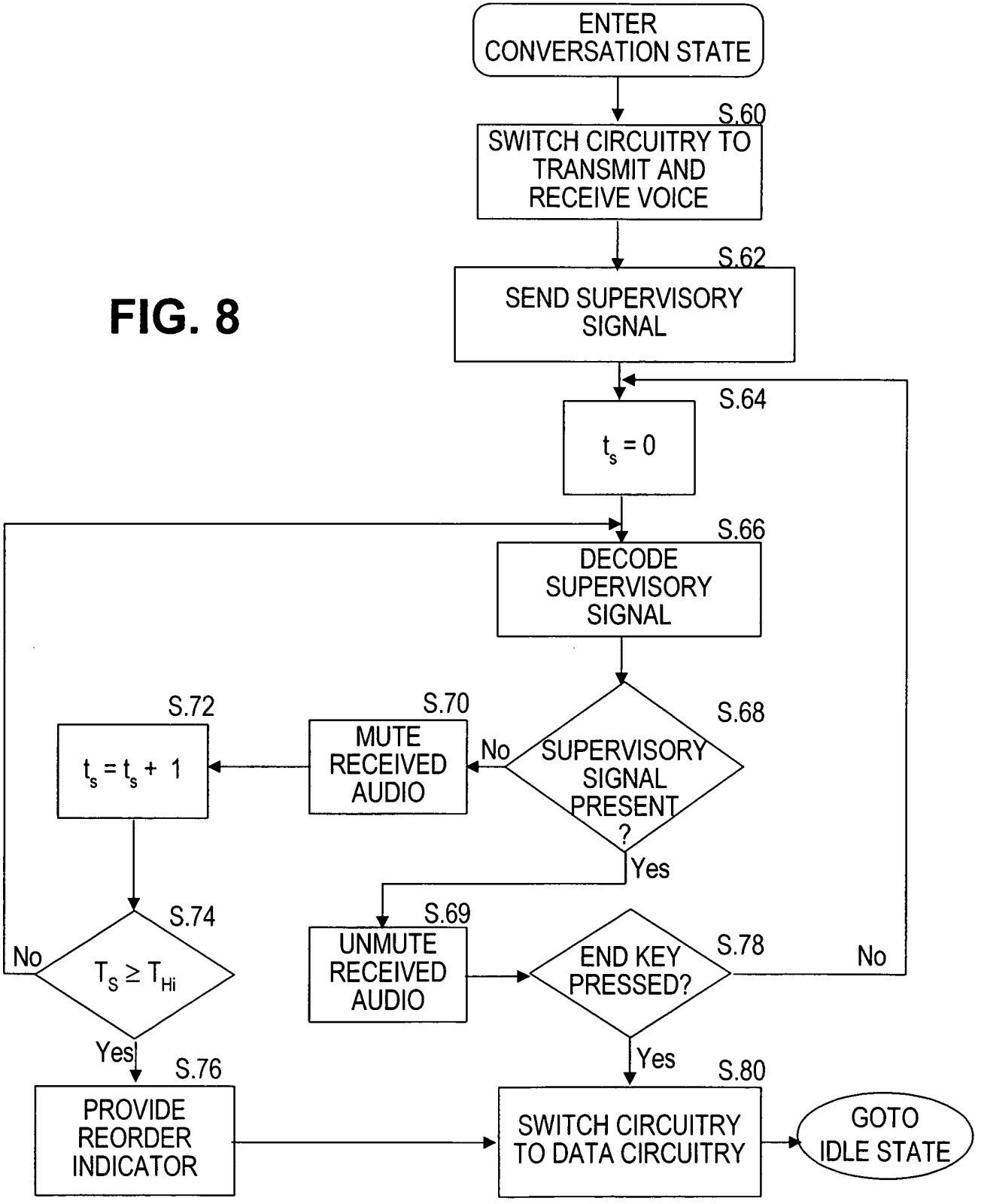

B
SEND SYNC SIGNAL
S.44
SEND PAGE MESSAGE
S.46
PAGE RESPONSE RECEIVED ?
S.48
NO
m = m + 1
S.50
m ≤ L ?
S.52
YES
NO
PROVIDE REORDER INDICATOR
S.54
YES
PROVIDE RINGBACK TONE
S.56
ANSWER WITHIN T_{alert} sec ?
S.58
NO
YES
ENTER IDLE STATE
ENTER CONVERSATION STATE

FIG. 7B

FIG. 8


ENTER CONVERSATION STATE
S.60
SWITCH CIRCUITRY TO TRANSMIT AND RECEIVE VOICE
S.62
SEND SUPERVISORY SIGNAL
S.64
$t_s = 0$
S.66
DECODE SUPERVISORY SIGNAL
S.68
SUPERVISORY SIGNAL PRESENT ?
No
S.70
MUTE RECEIVED AUDIO
S.72
$t_s = t_s + 1$
Yes
S.69
UNMUTE RECEIVED AUDIO
S.74
$T_S \geq T_{Hi}$
No
Yes
S.76
PROVIDE REORDER INDICATOR
S.78
END KEY PRESSED?
No
Yes
S.80
SWITCH CIRCUITRY TO DATA CIRCUITRY
GOTO IDLE STATE

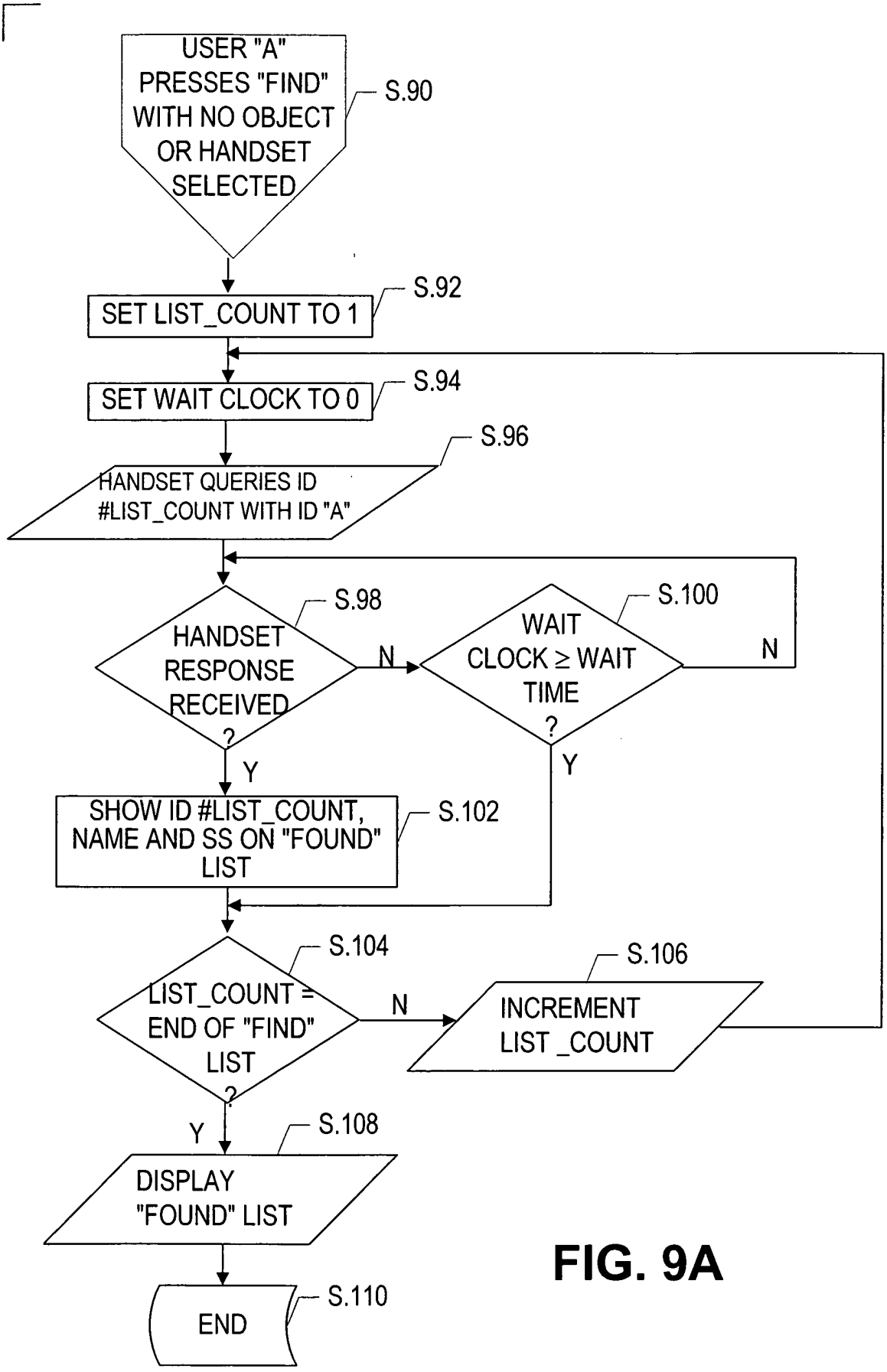

USER "A" PRESSES "FIND" WITH NO OBJECT OR HANDSET SELECTED
S.90
SET LIST_COUNT TO 1
S.92
SET WAIT CLOCK TO 0
S.94
HANDSET QUERIES ID #LIST_COUNT WITH ID "A"
S.96
HANDSET RESPONSE RECEIVED ?
S.98
N
WAIT CLOCK ≥ WAIT TIME ?
S.100
N
Y
Y
SHOW ID #LIST_COUNT, NAME AND SS ON "FOUND" LIST
S.102
LIST_COUNT = END OF "FIND" LIST ?
S.104
N
INCREMENT LIST _COUNT
S.106
Y
DISPLAY "FOUND" LIST
S.108
END
S.110

FIG. 9A

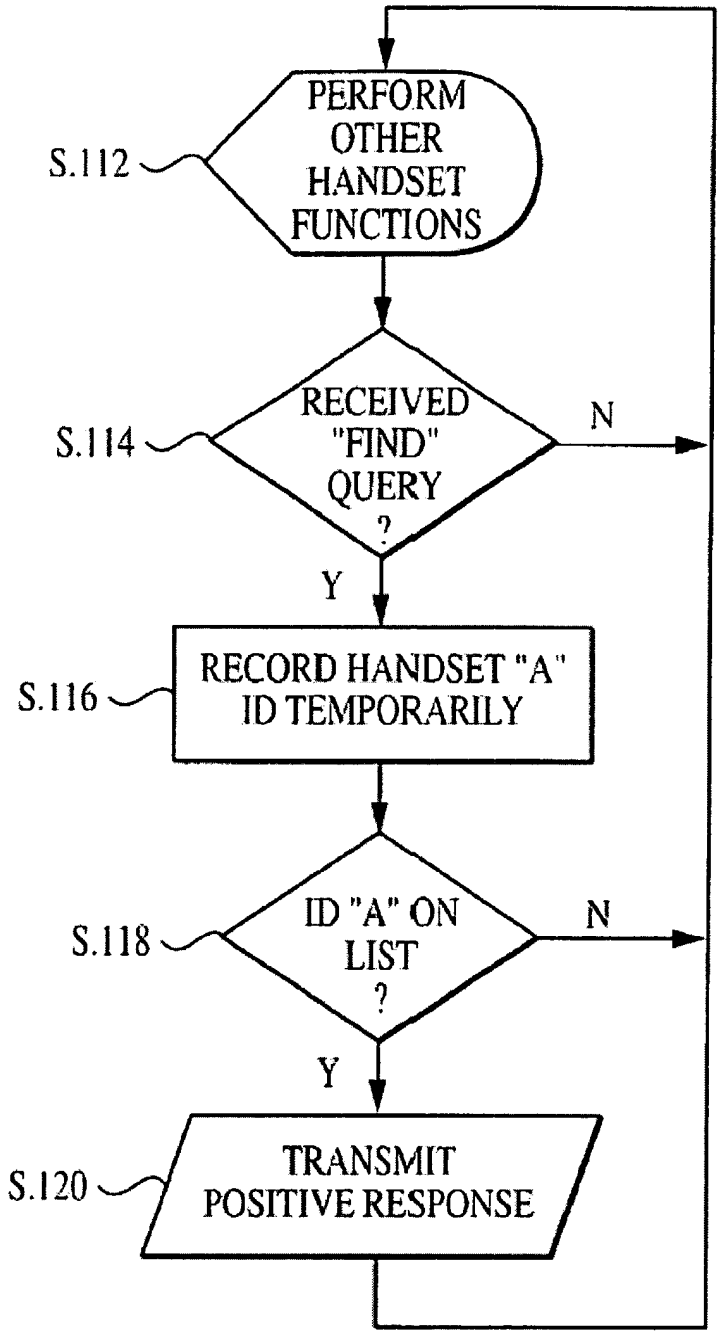

S.112
PERFORM OTHER HANDSET FUNCTIONS
S.114
RECEIVED "FIND" QUERY ?
N
Y
S.116
RECORD HANDSET "A" ID TEMPORARILY
S.118
ID "A" ON LIST ?
N
Y
S.120
TRANSMIT POSITIVE RESPONSE

FIG. 9B

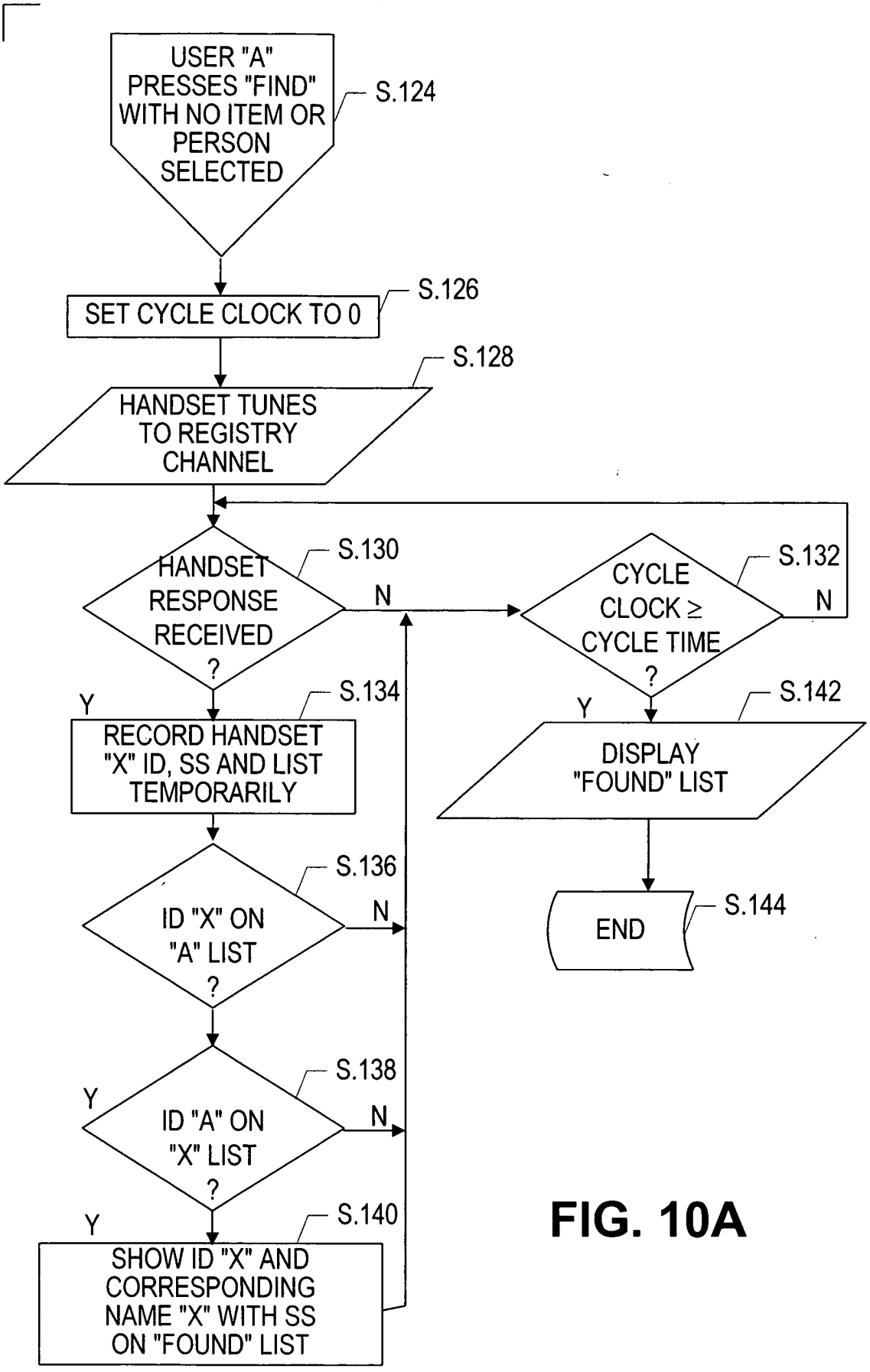

USER "A" PRESSES "FIND" WITH NO ITEM OR PERSON SELECTED
S.124
SET CYCLE CLOCK TO 0
S.126
HANDSET TUNES TO REGISTRY CHANNEL
S.128
HANDSET RESPONSE RECEIVED ?
S.130
N
Y
CYCLE CLOCK ≥ CYCLE TIME ?
S.132
N
Y
RECORD HANDSET "X" ID, SS AND LIST TEMPORARILY
S.134
DISPLAY "FOUND" LIST
S.142
ID "X" ON "A" LIST ?
S.136
N
END
S.144
ID "A" ON "X" LIST ?
S.138
Y
N
SHOW ID "X" AND CORRESPONDING NAME "X" WITH SS ON "FOUND" LIST
S.140
Y

FIG. 10A

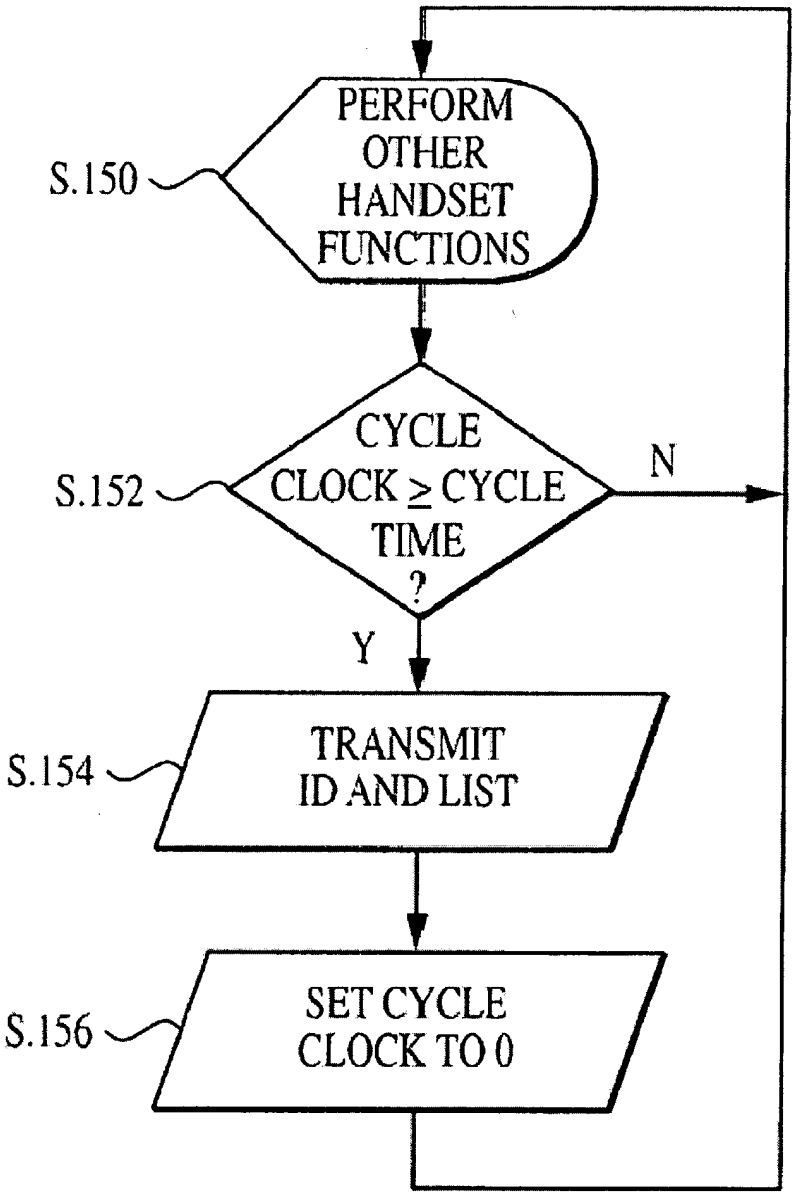

S.150
PERFORM OTHER HANDSET FUNCTIONS
S.152
CYCLE CLOCK ≥ CYCLE TIME ?
N
Y
S.154
TRANSMIT ID AND LIST
S.156
SET CYCLE CLOCK TO 0

FIG. 10B

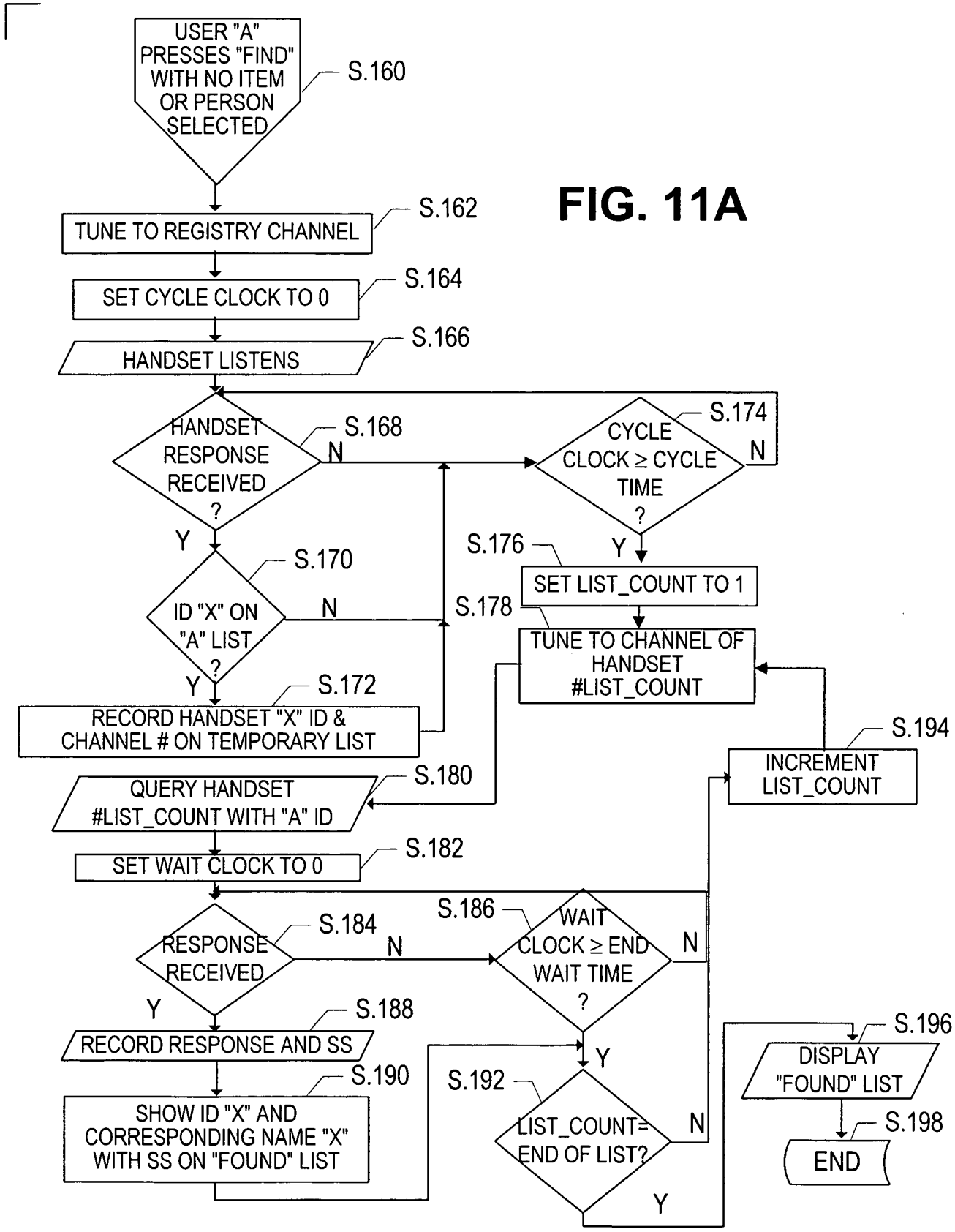

USER "A" PRESSES "FIND" WITH NO ITEM OR PERSON SELECTED
S.160
TUNE TO REGISTRY CHANNEL
S.162
SET CYCLE CLOCK TO 0
S.164
HANDSET LISTENS
S.166
HANDSET RESPONSE RECEIVED ?
S.168
N
Y
CYCLE CLOCK ≥ CYCLE TIME ?
S.174
N
Y
S.176
SET LIST_COUNT TO 1
ID "X" ON "A" LIST ?
S.170
N
Y
S.178
TUNE TO CHANNEL OF HANDSET #LIST_COUNT
RECORD HANDSET "X" ID & CHANNEL # ON TEMPORARY LIST
S.172
S.194
INCREMENT LIST_COUNT
QUERY HANDSET #LIST_COUNT WITH "A" ID
S.180
SET WAIT CLOCK TO 0
S.182
RESPONSE RECEIVED
S.184
N
Y
WAIT CLOCK ≥ END WAIT TIME ?
S.186
N
Y
RECORD RESPONSE AND SS
S.188
SHOW ID "X" AND CORRESPONDING NAME "X" WITH SS ON "FOUND" LIST
S.190
LIST_COUNT= END OF LIST?
S.192
N
Y
DISPLAY "FOUND" LIST
S.196
S.198
END

FIG. 11A

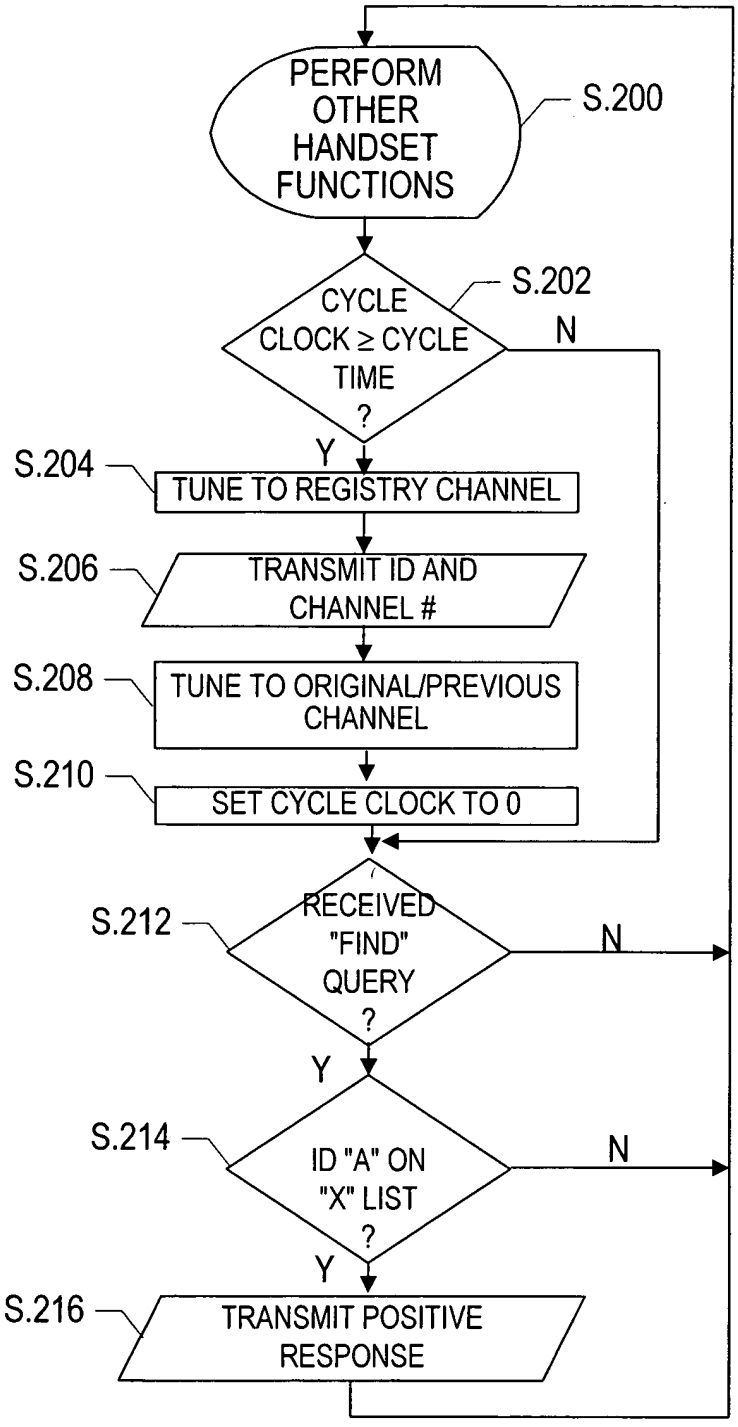
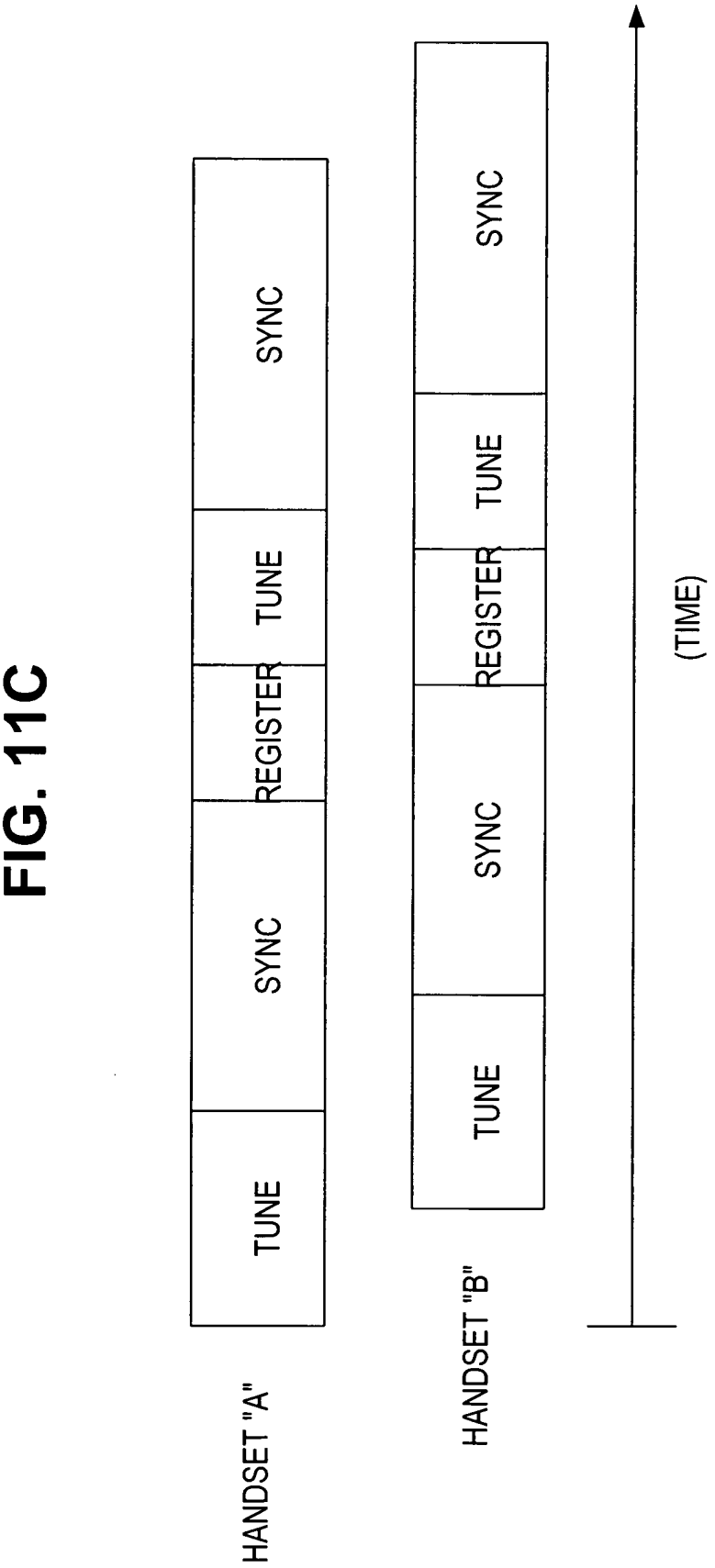

PERFORM OTHER HANDSET FUNCTIONS
S.200
CYCLE CLOCK ≥ CYCLE TIME ?
S.202
N
Y
S.204
TUNE TO REGISTRY CHANNEL
S.206
TRANSMIT ID AND CHANNEL #
S.208
TUNE TO ORIGINAL/PREVIOUS CHANNEL
S.210
SET CYCLE CLOCK TO 0
S.212
RECEIVED "FIND" QUERY ?
N
Y
S.214
ID "A" ON "X" LIST ?
N
Y
S.216
TRANSMIT POSITIVE RESPONSE

FIG. 11B

FIG. 11C


HANDSET "A"
TUNE
SYNC
REGISTER
TUNE
SYNC
HANDSET "B"
TUNE
SYNC
REGISTER
TUNE
SYNC
(TIME)

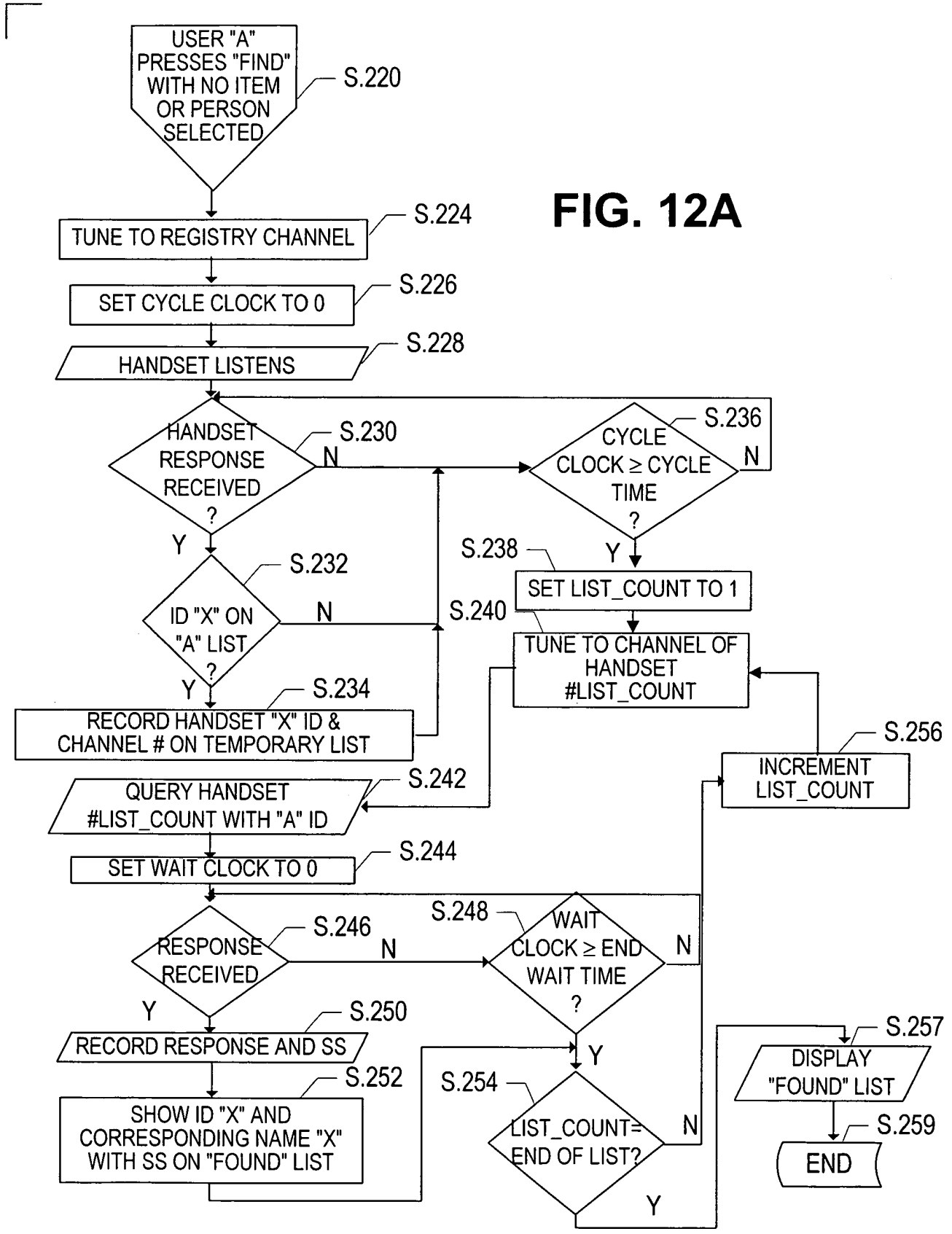
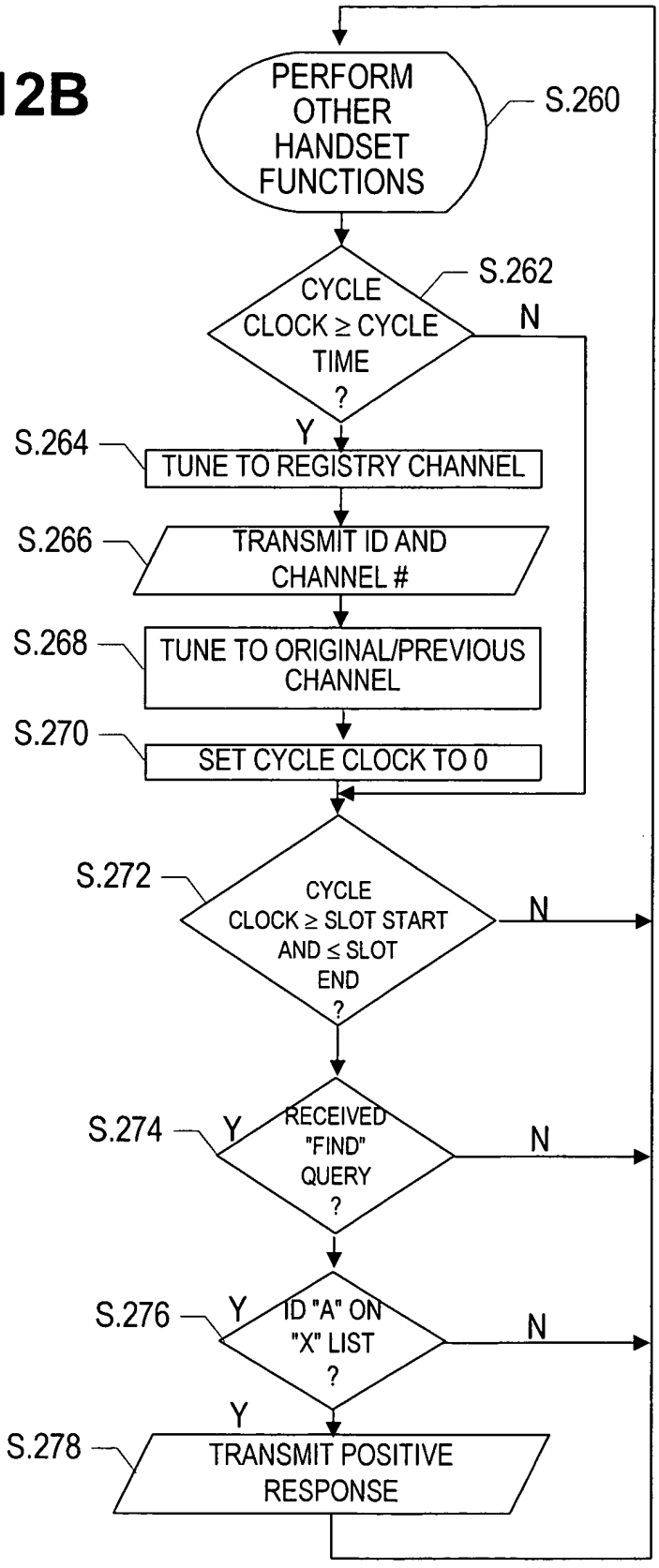

USER "A" PRESSES "FIND" WITH NO ITEM OR PERSON SELECTED
S.220
TUNE TO REGISTRY CHANNEL
S.224
SET CYCLE CLOCK TO 0
S.226
HANDSET LISTENS
S.228
HANDSET RESPONSE RECEIVED ?
S.230
N
Y
CYCLE CLOCK ≥ CYCLE TIME ?
S.236
N
Y
ID "X" ON "A" LIST ?
S.232
N
Y
RECORD HANDSET "X" ID & CHANNEL # ON TEMPORARY LIST
S.234
S.238
SET LIST_COUNT TO 1
S.240
TUNE TO CHANNEL OF HANDSET #LIST_COUNT
S.256
INCREMENT LIST_COUNT
QUERY HANDSET #LIST_COUNT WITH "A" ID
S.242
SET WAIT CLOCK TO 0
S.244
RESPONSE RECEIVED
S.246
N
Y
WAIT CLOCK ≥ END WAIT TIME ?
S.248
N
Y
RECORD RESPONSE AND SS
S.250
SHOW ID "X" AND CORRESPONDING NAME "X" WITH SS ON "FOUND" LIST
S.252
LIST_COUNT= END OF LIST?
S.254
N
Y
DISPLAY "FOUND" LIST
S.257
END
S.259

FIG. 12A

FIG. 12B


PERFORM OTHER HANDSET FUNCTIONS
S.260
CYCLE CLOCK ≥ CYCLE TIME ?
S.262
N
Y
S.264
TUNE TO REGISTRY CHANNEL
S.266
TRANSMIT ID AND CHANNEL #
S.268
TUNE TO ORIGINAL/PREVIOUS CHANNEL
S.270
SET CYCLE CLOCK TO 0
S.272
CYCLE CLOCK ≥ SLOT START AND ≤ SLOT END ?
N
S.274
Y
RECEIVED "FIND" QUERY ?
N
S.276
Y
ID "A" ON "X" LIST ?
N
Y
S.278
TRANSMIT POSITIVE RESPONSE

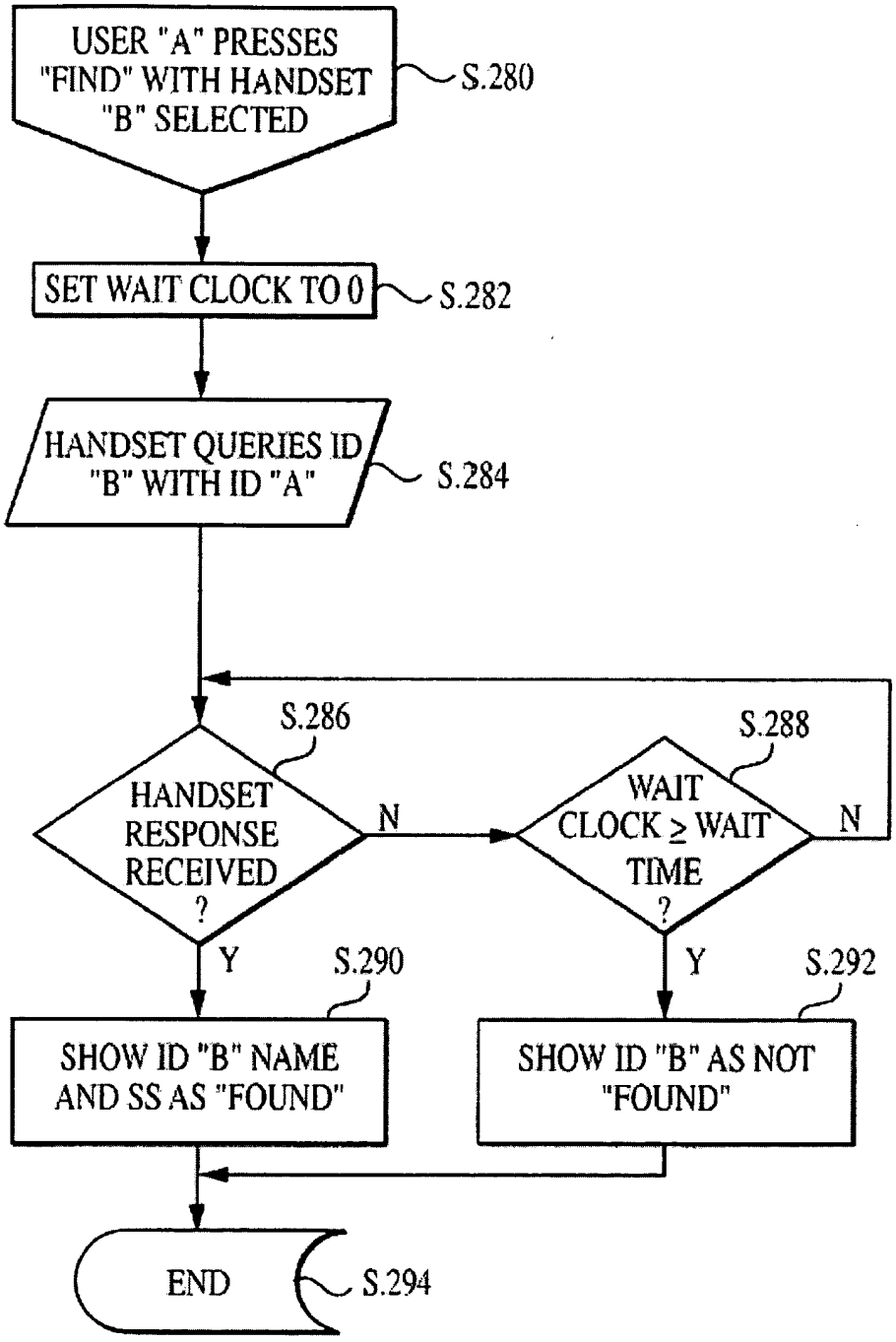

USER "A" PRESSES "FIND" WITH HANDSET "B" SELECTED
S.280
SET WAIT CLOCK TO 0
S.282
HANDSET QUERIES ID "B" WITH ID "A"
S.284
S.286
HANDSET RESPONSE RECEIVED ?
N
S.288
WAIT CLOCK ≥ WAIT TIME ?
N
Y
S.290
SHOW ID "B" NAME AND SS AS "FOUND"
Y
S.292
SHOW ID "B" AS NOT "FOUND"
END
S.294

FIG. 13A

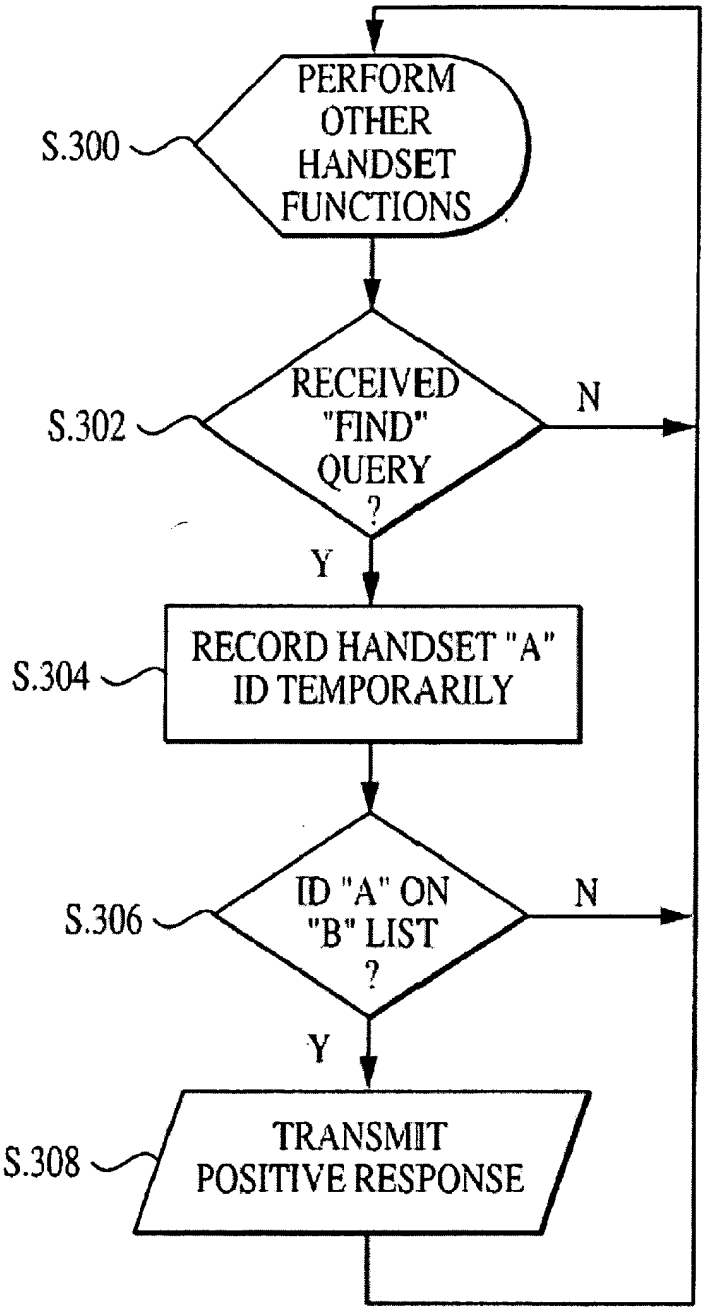

S.300
PERFORM OTHER HANDSET FUNCTIONS
S.302
RECEIVED "FIND" QUERY ?
N
Y
S.304
RECORD HANDSET "A" ID TEMPORARILY
S.306
ID "A" ON "B" LIST ?
N
Y
S.308
TRANSMIT POSITIVE RESPONSE

FIG. 13B

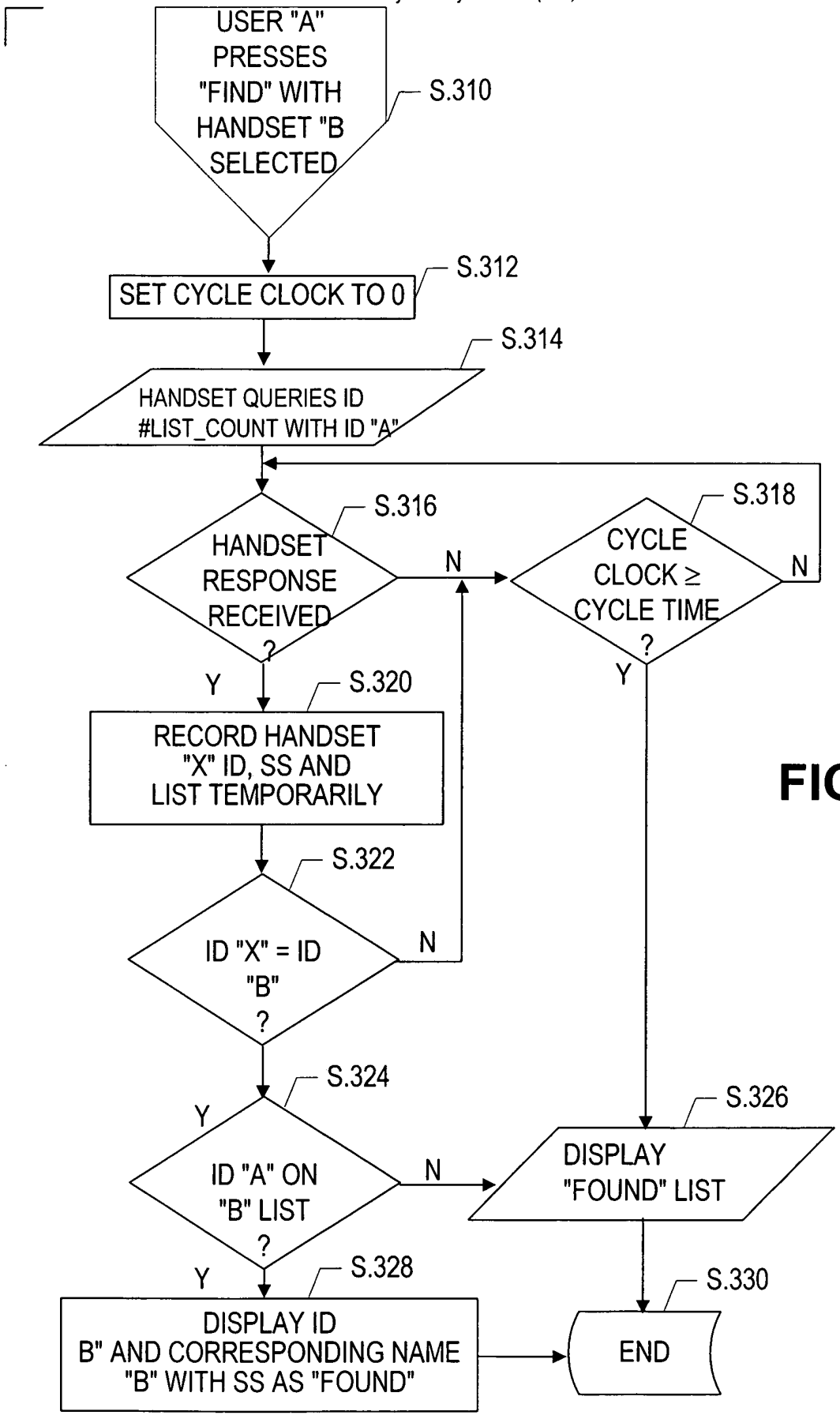

USER "A" PRESSES "FIND" WITH HANDSET "B SELECTED
S.310
SET CYCLE CLOCK TO 0
S.312
HANDSET QUERIES ID #LIST_COUNT WITH ID "A"
S.314
HANDSET RESPONSE RECEIVED ?
S.316
N
CYCLE CLOCK ≥ CYCLE TIME ?
S.318
N
Y
Y
RECORD HANDSET "X" ID, SS AND LIST TEMPORARILY
S.320
ID "X" = ID "B" ?
S.322
N
Y
ID "A" ON "B" LIST ?
S.324
N
DISPLAY "FOUND" LIST
S.326
Y
DISPLAY ID B" AND CORRESPONDING NAME "B" WITH SS AS "FOUND"
S.328
END
S.330

FIG. 14A

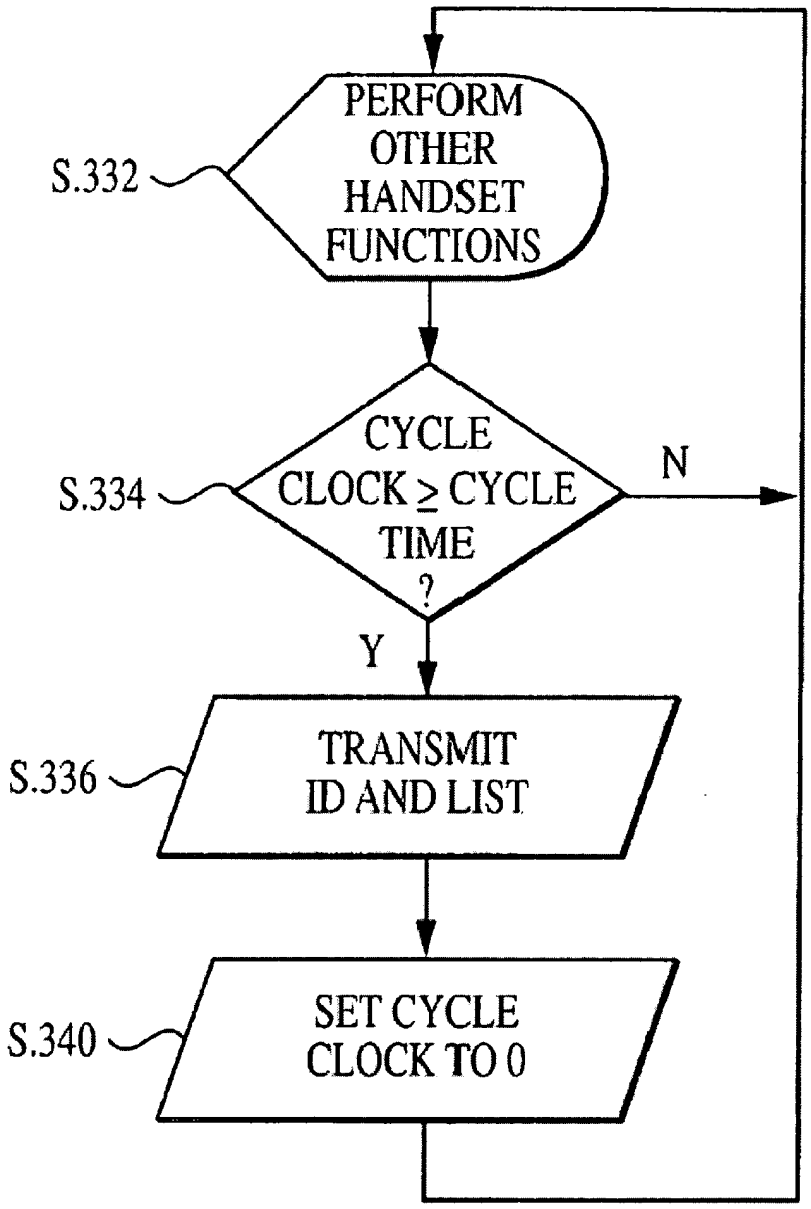

S.332
PERFORM OTHER HANDSET FUNCTIONS
S.334
CYCLE CLOCK ≥ CYCLE TIME ?
N
Y
S.336
TRANSMIT ID AND LIST
S.340
SET CYCLE CLOCK TO 0

FIG. 14B

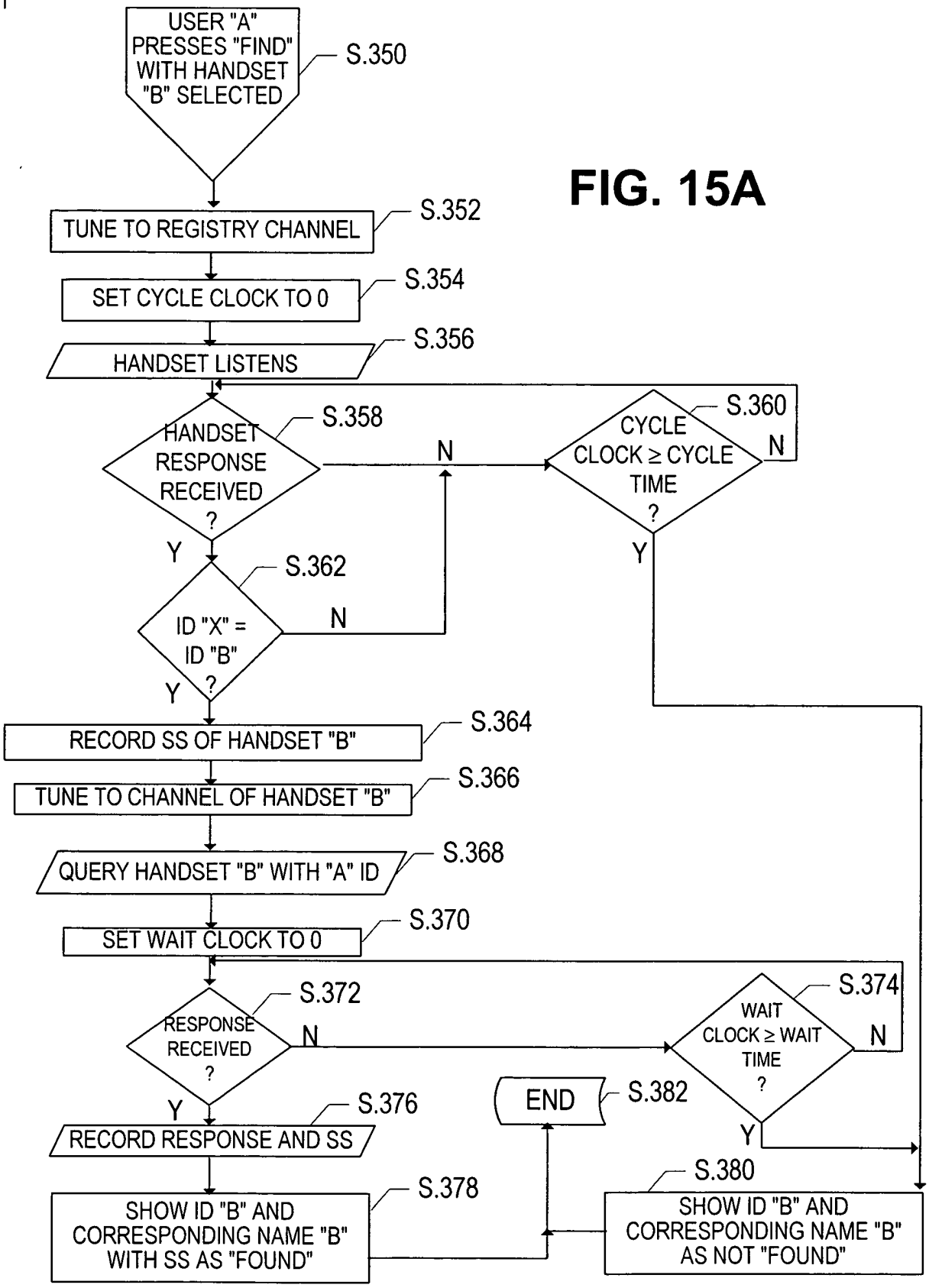
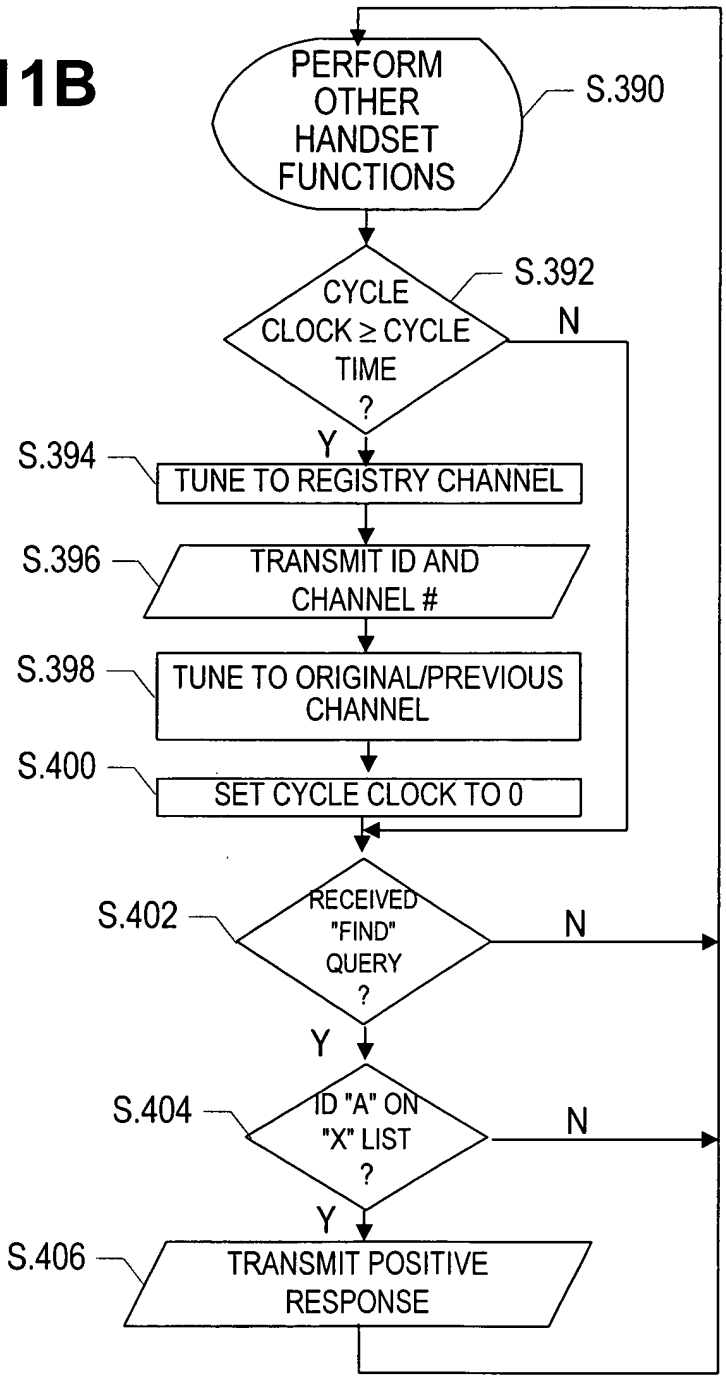

USER "A" PRESSES "FIND" WITH HANDSET "B" SELECTED
S.350
TUNE TO REGISTRY CHANNEL
S.352
SET CYCLE CLOCK TO 0
S.354
HANDSET LISTENS
S.356
HANDSET RESPONSE RECEIVED ?
S.358
N
CYCLE CLOCK ≥ CYCLE TIME ?
S.360
N
Y
Y
ID "X" = ID "B" ?
S.362
N
Y
RECORD SS OF HANDSET "B"
S.364
TUNE TO CHANNEL OF HANDSET "B"
S.366
QUERY HANDSET "B" WITH "A" ID
S.368
SET WAIT CLOCK TO 0
S.370
RESPONSE RECEIVED ?
S.372
N
WAIT CLOCK ≥ WAIT TIME ?
S.374
N
Y
Y
RECORD RESPONSE AND SS
S.376
END
S.382
SHOW ID "B" AND CORRESPONDING NAME "B" WITH SS AS "FOUND"
S.378
SHOW ID "B" AND CORRESPONDING NAME "B" AS NOT "FOUND"
S.380

FIG. 15A

FIG. 11B


PERFORM OTHER HANDSET FUNCTIONS
S.390
CYCLE CLOCK ≥ CYCLE TIME ?
S.392
N
Y
S.394
TUNE TO REGISTRY CHANNEL
S.396
TRANSMIT ID AND CHANNEL #
S.398
TUNE TO ORIGINAL/PREVIOUS CHANNEL
S.400
SET CYCLE CLOCK TO 0
S.402
RECEIVED "FIND" QUERY ?
N
Y
S.404
ID "A" ON "X" LIST ?
N
Y
S.406
TRANSMIT POSITIVE RESPONSE

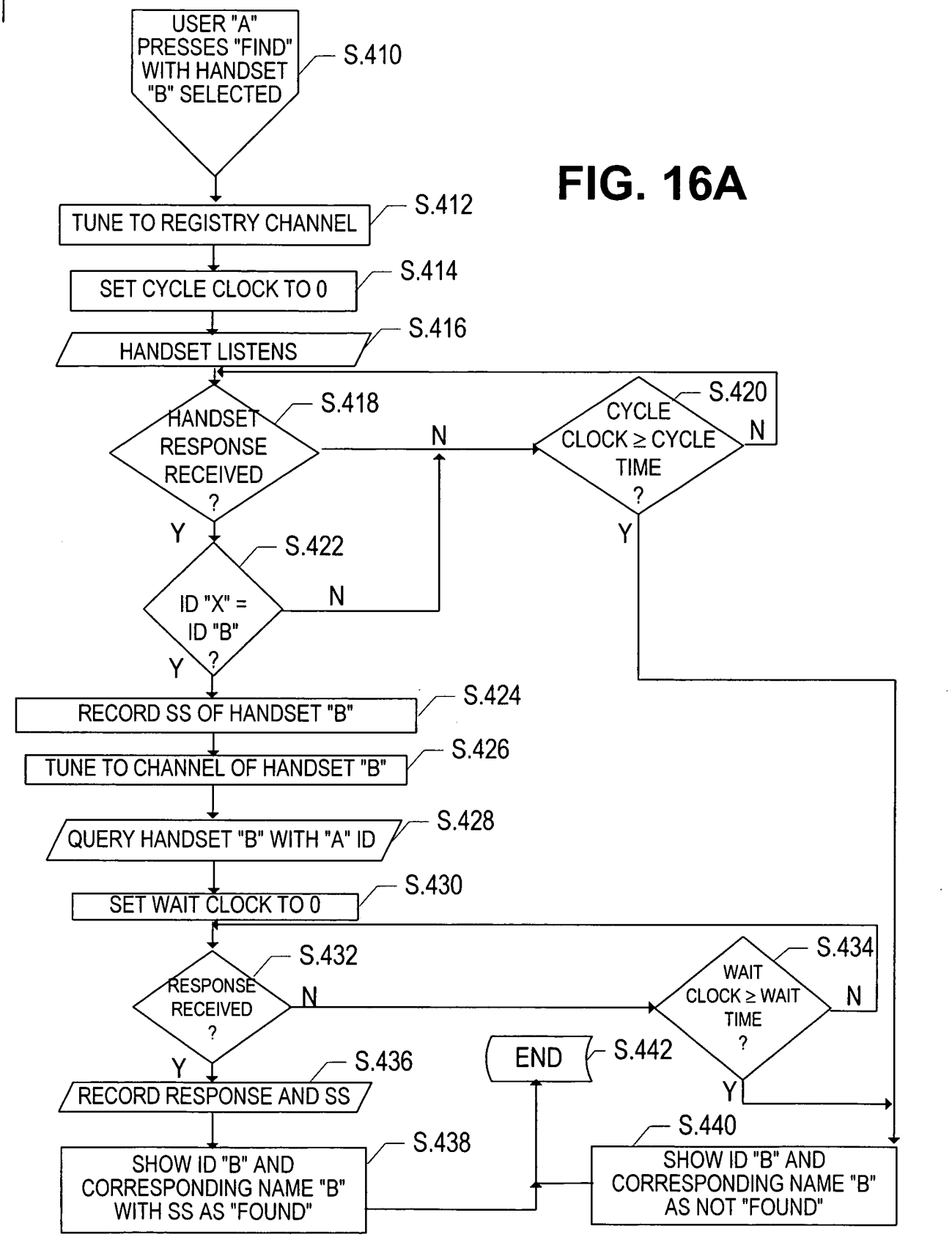
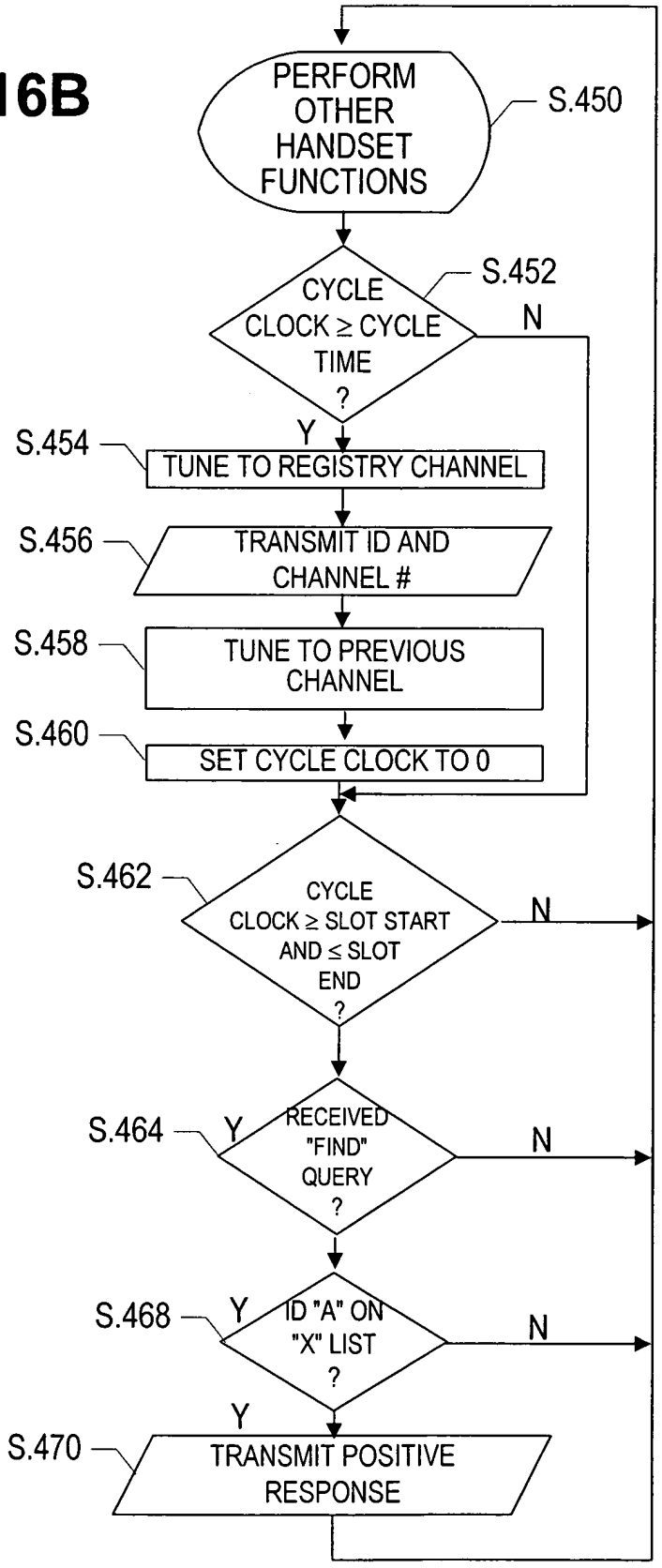

USER "A" PRESSES "FIND" WITH HANDSET "B" SELECTED
S.410
TUNE TO REGISTRY CHANNEL
S.412
SET CYCLE CLOCK TO 0
S.414
HANDSET LISTENS
S.416
HANDSET RESPONSE RECEIVED ?
S.418
N
CYCLE CLOCK ≥ CYCLE TIME ?
S.420
N
Y
Y
ID "X" = ID "B" ?
S.422
N
Y
RECORD SS OF HANDSET "B"
S.424
TUNE TO CHANNEL OF HANDSET "B"
S.426
QUERY HANDSET "B" WITH "A" ID
S.428
SET WAIT CLOCK TO 0
S.430
RESPONSE RECEIVED ?
S.432
N
WAIT CLOCK ≥ WAIT TIME ?
S.434
N
Y
Y
RECORD RESPONSE AND SS
S.436
END
S.442
SHOW ID "B" AND CORRESPONDING NAME "B" WITH SS AS "FOUND"
S.438
SHOW ID "B" AND CORRESPONDING NAME "B" AS NOT "FOUND"
S.440

FIG. 16A

FIG. 16B


PERFORM OTHER HANDSET FUNCTIONS
S.450
CYCLE CLOCK ≥ CYCLE TIME ?
S.452
N
Y
S.454
TUNE TO REGISTRY CHANNEL
S.456
TRANSMIT ID AND CHANNEL #
S.458
TUNE TO PREVIOUS CHANNEL
S.460
SET CYCLE CLOCK TO 0
S.462
CYCLE CLOCK ≥ SLOT START AND ≤ SLOT END ?
N
S.464
Y
RECEIVED "FIND" QUERY ?
N
S.468
Y
ID "A" ON "X" LIST ?
N
Y
S.470
TRANSMIT POSITIVE RESPONSE

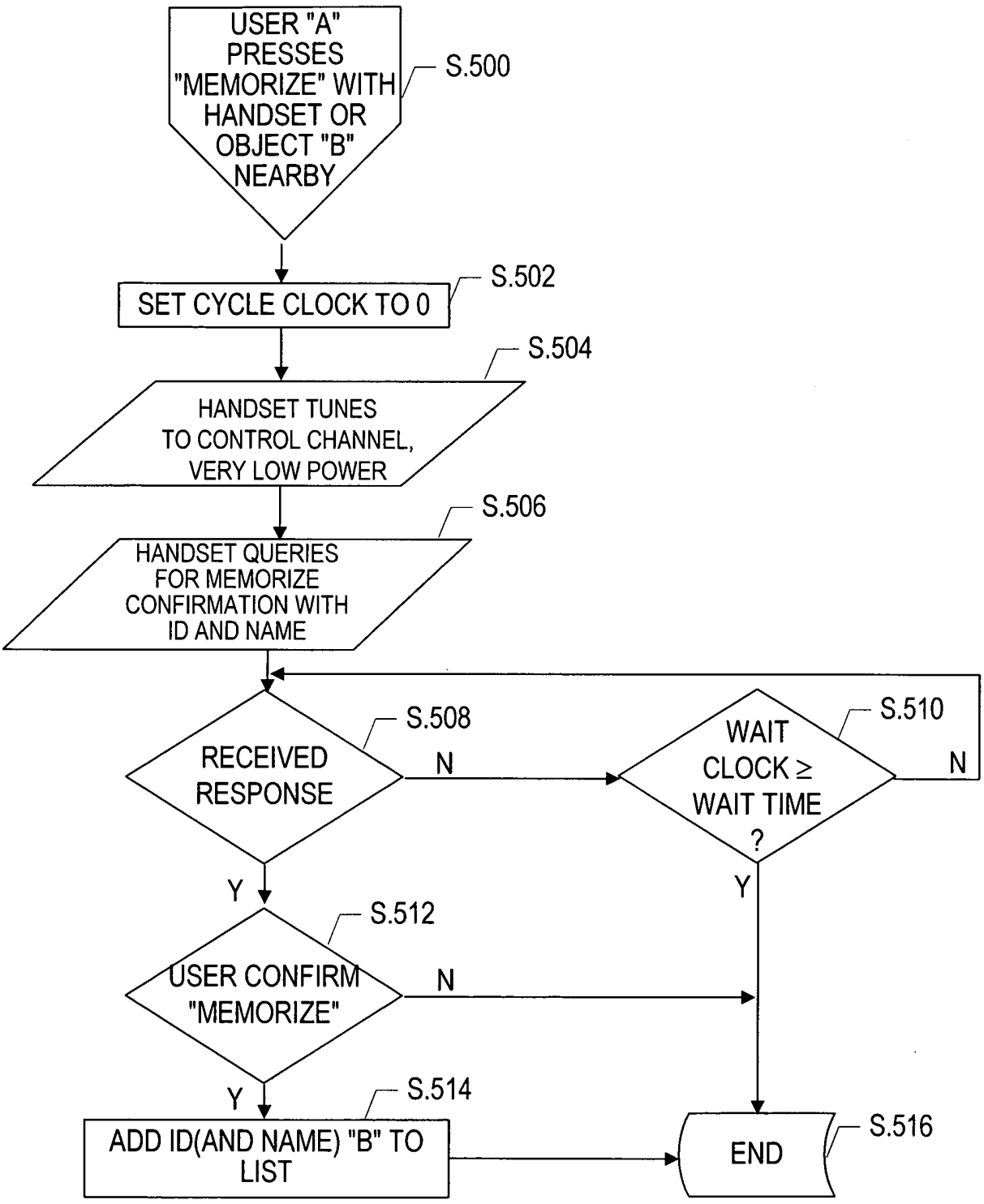

USER "A" PRESSES "MEMORIZE" WITH HANDSET OR OBJECT "B" NEARBY
S.500
SET CYCLE CLOCK TO 0
S.502
HANDSET TUNES TO CONTROL CHANNEL, VERY LOW POWER
S.504
HANDSET QUERIES FOR MEMORIZE CONFIRMATION WITH ID AND NAME
S.506
RECEIVED RESPONSE
S.508
N
WAIT CLOCK ≥ WAIT TIME ?
S.510
N
Y
Y
USER CONFIRM "MEMORIZE"
S.512
N
Y
ADD ID(AND NAME) "B" TO LIST
S.514
END
S.516

FIG. 17A

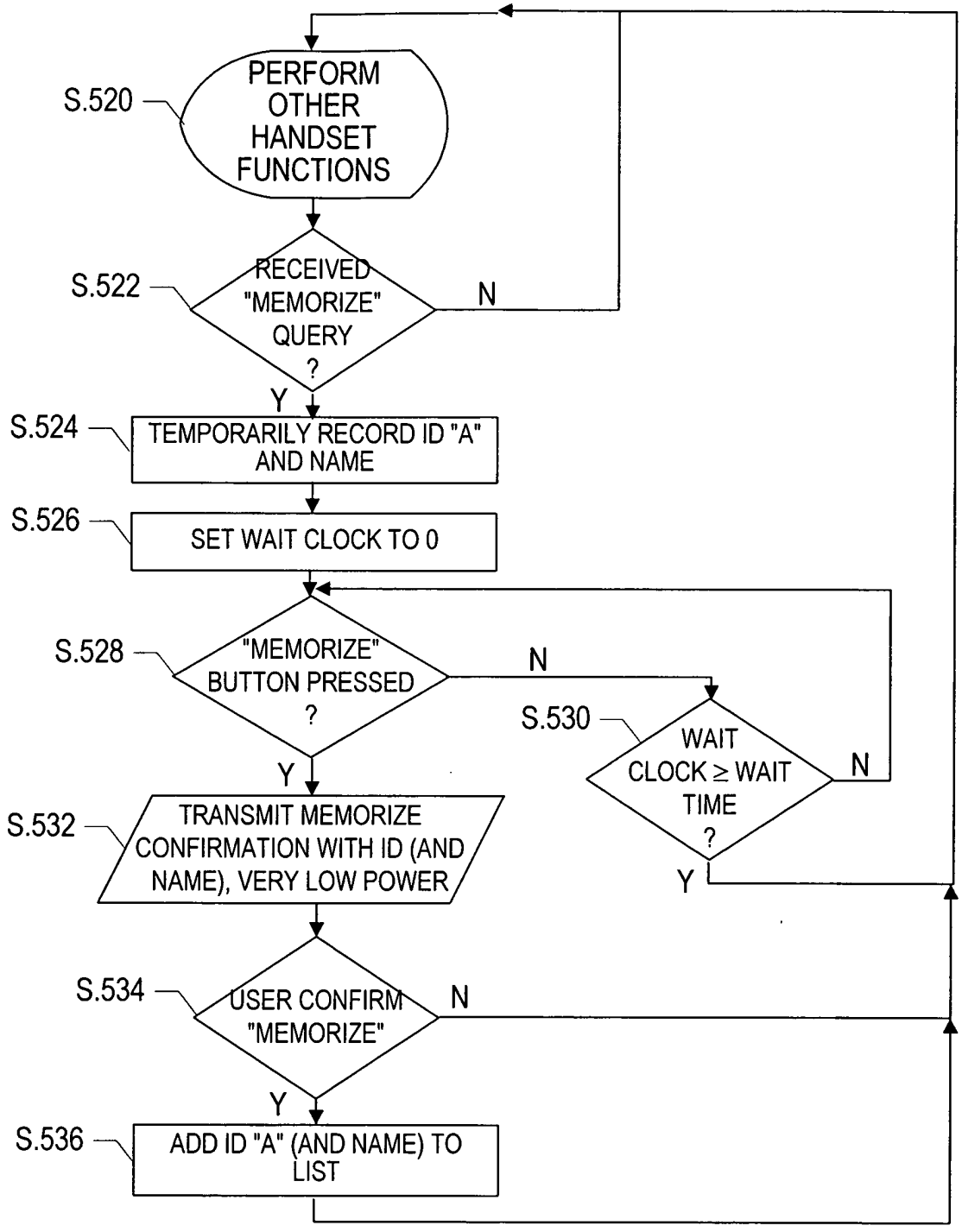
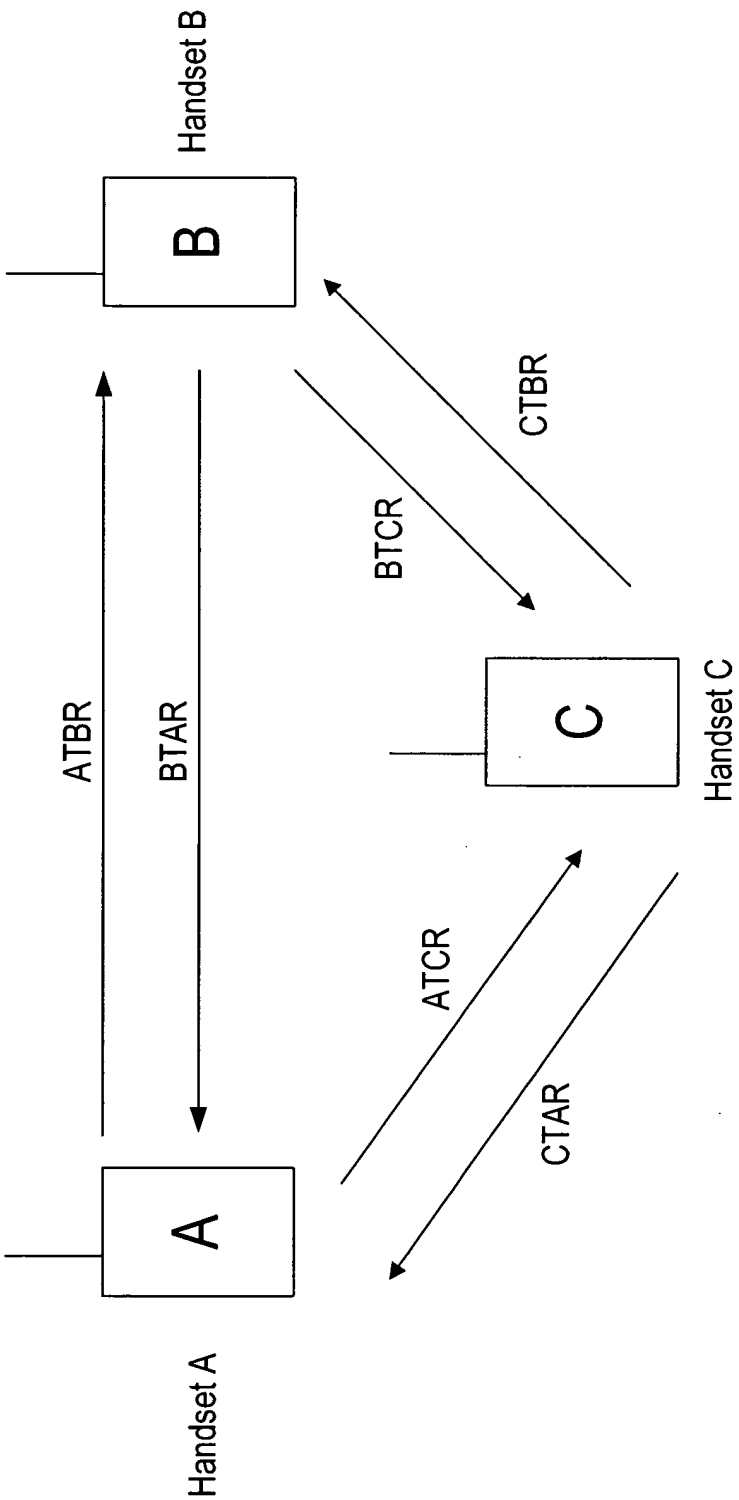

S.520
PERFORM OTHER HANDSET FUNCTIONS
S.522
RECEIVED "MEMORIZE" QUERY ?
N
Y
S.524
TEMPORARILY RECORD ID "A" AND NAME
S.526
SET WAIT CLOCK TO 0
S.528
"MEMORIZE" BUTTON PRESSED ?
N
Y
S.530
WAIT CLOCK ≥ WAIT TIME ?
N
Y
S.532
TRANSMIT MEMORIZE CONFIRMATION WITH ID (AND NAME), VERY LOW POWER
S.534
USER CONFIRM "MEMORIZE"
N
Y
S.536
ADD ID "A" (AND NAME) TO LIST

FIG. 17B

FIG. 18A


Handset B
B
CTBR
BTCR
ATBR
BTAR
C
Handset C
ATCR
CTAR
A
Handset A

	TS1	TS2	TS3
HANDSET A Transmit	C	ATBR	ATCR
Receive	C	CTAR	BTAR
HANDSET B Transmit	C	BTCR	BTAR
Receive	C	ATBR	CTBR
HANDSET C Transmit	C	CTAR	CTBR
Receive	C	BTCR	ATCR

FIG. 18B

	TS1	TS2	TS3
HANDSET A Transmit	C	ATBR	ATCR
Receive	CTAR	BTAR	C
HANDSET B Transmit	BTCR	BTAR	C
Receive	C	ATBR	CTBR
HANDSET C Transmit	CTAR	C	CTBR
Receive	BTCR	C	ATCR

FIG. 18B

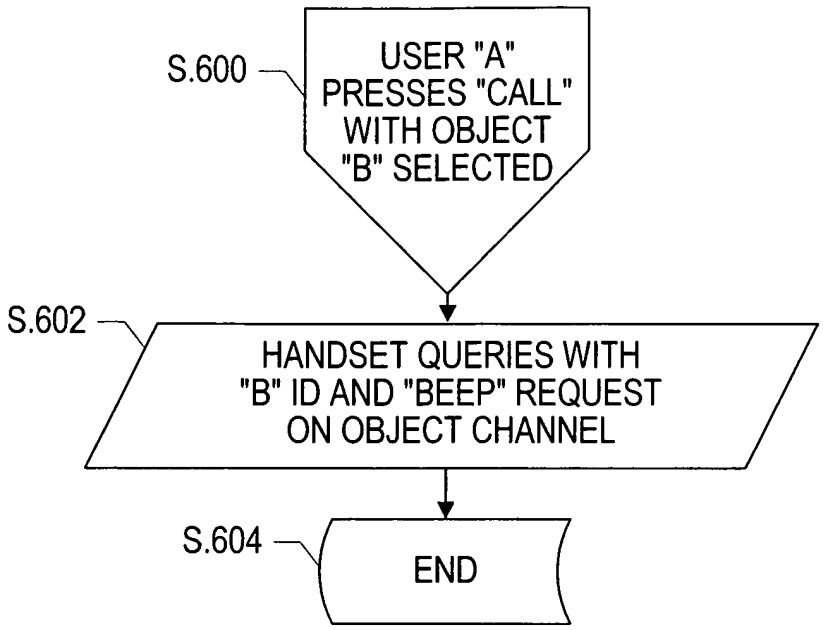


FIG. 19A

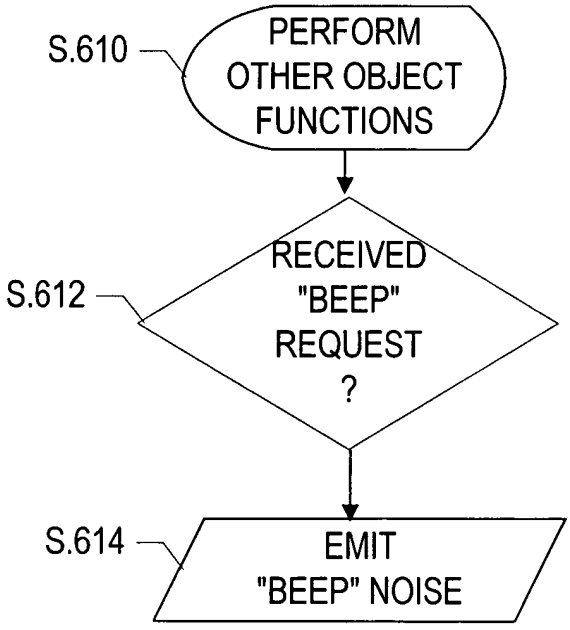


FIG. 19B

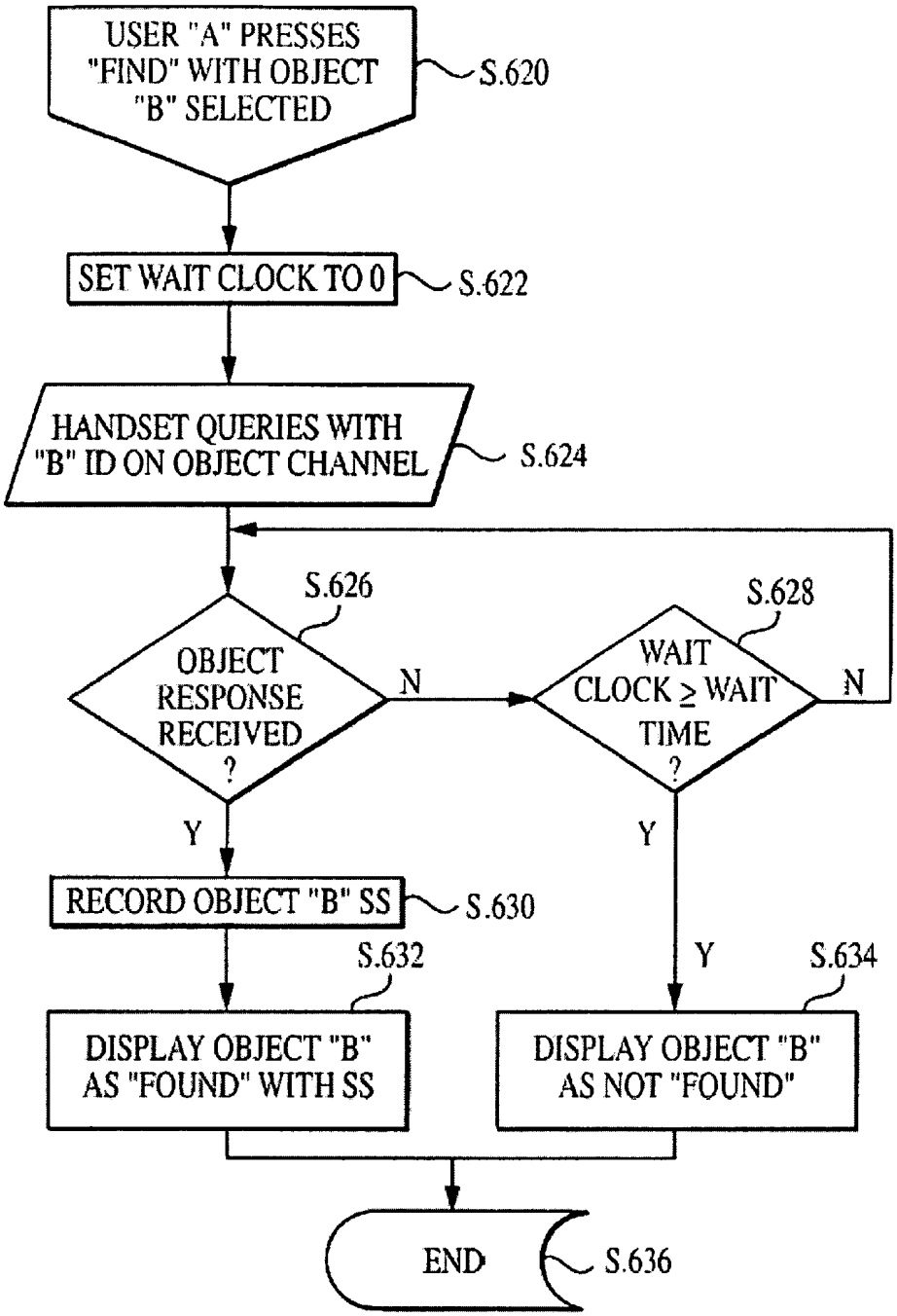

USER "A" PRESSES "FIND" WITH OBJECT "B" SELECTED
S.620
SET WAIT CLOCK TO 0
S.622
HANDSET QUERIES WITH "B" ID ON OBJECT CHANNEL
S.624
S.626
OBJECT RESPONSE RECEIVED ?
N
S.628
WAIT CLOCK ≥ WAIT TIME ?
N
Y
Y
RECORD OBJECT "B" SS
S.630
S.632
DISPLAY OBJECT "B" AS "FOUND" WITH SS
Y
S.634
DISPLAY OBJECT "B" AS NOT "FOUND"
END
S.636

FIG. 20A

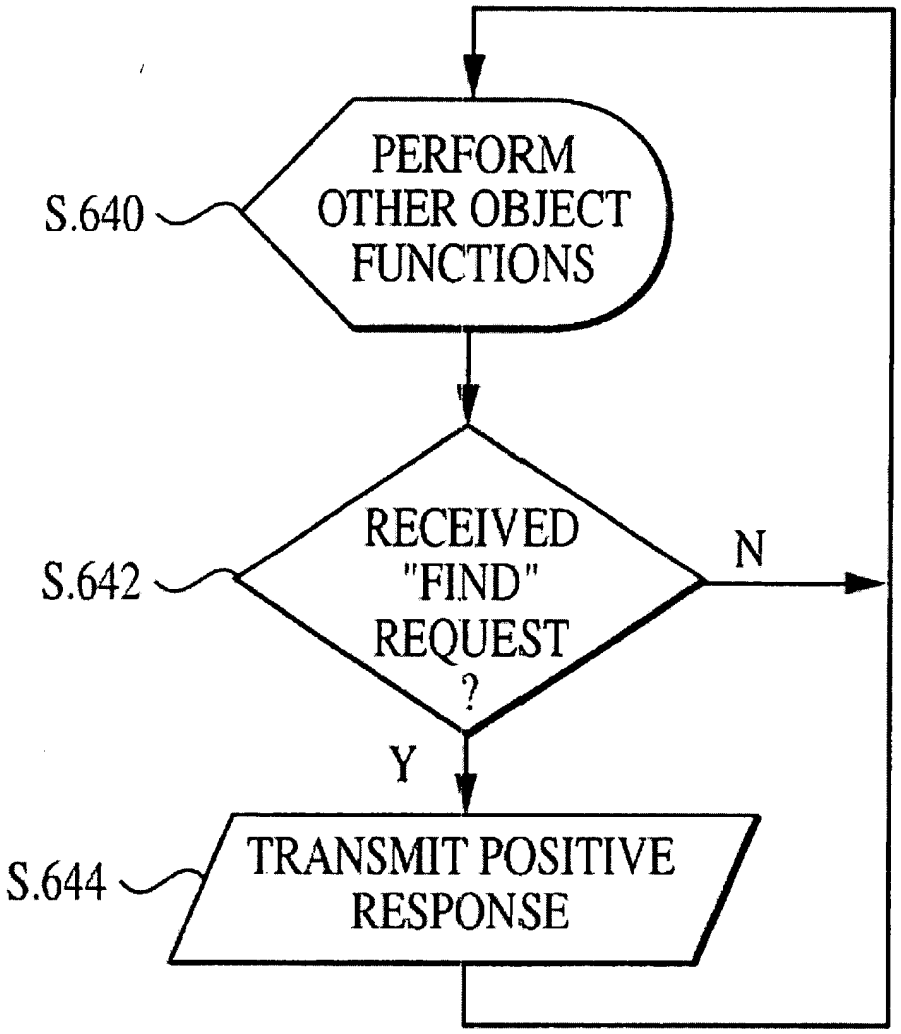

S.640
PERFORM OTHER OBJECT FUNCTIONS
S.642
RECEIVED "FIND" REQUEST ?
N
Y
S.644
TRANSMIT POSITIVE RESPONSE

FIG. 20B

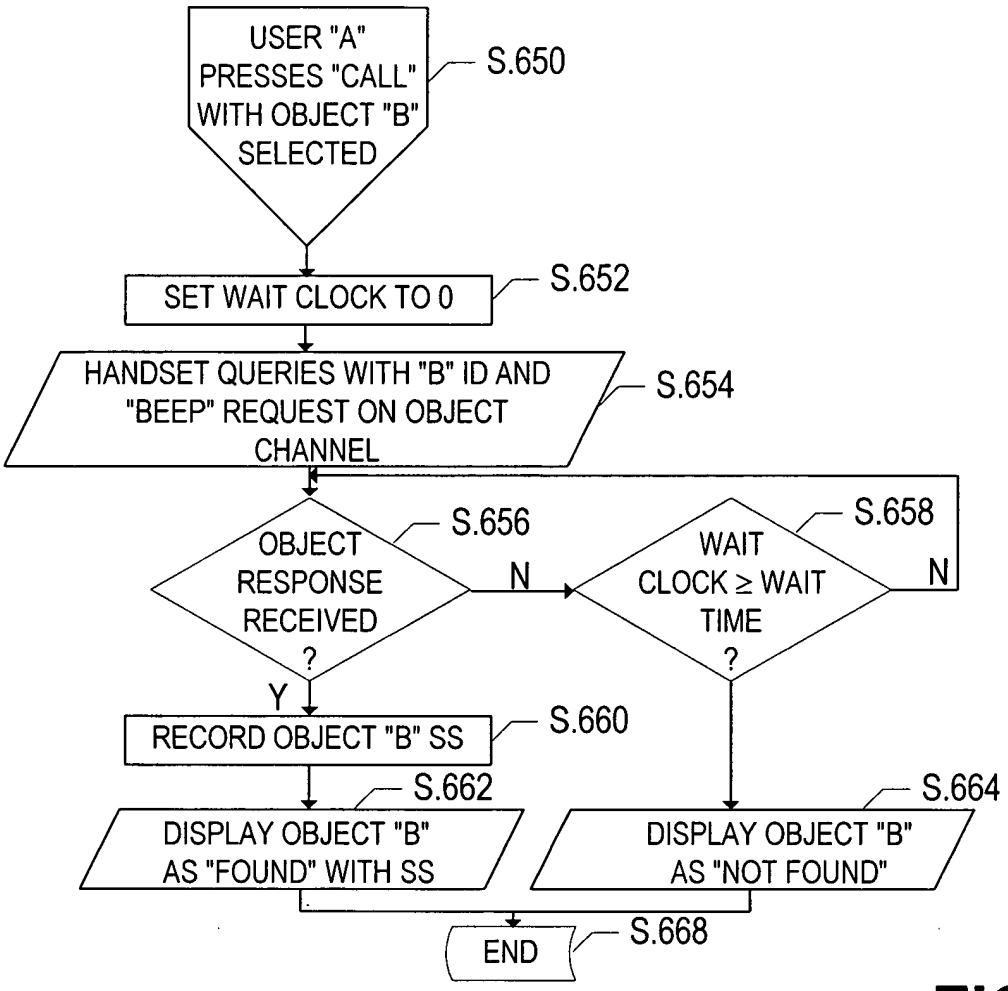
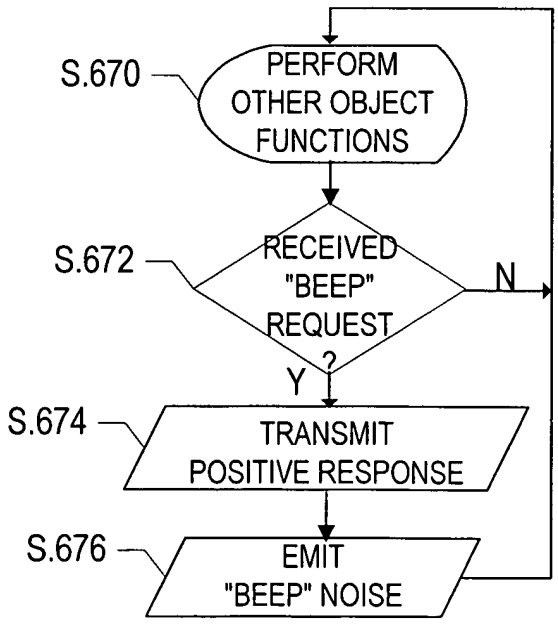


FIG. 21A

FIG. 21B



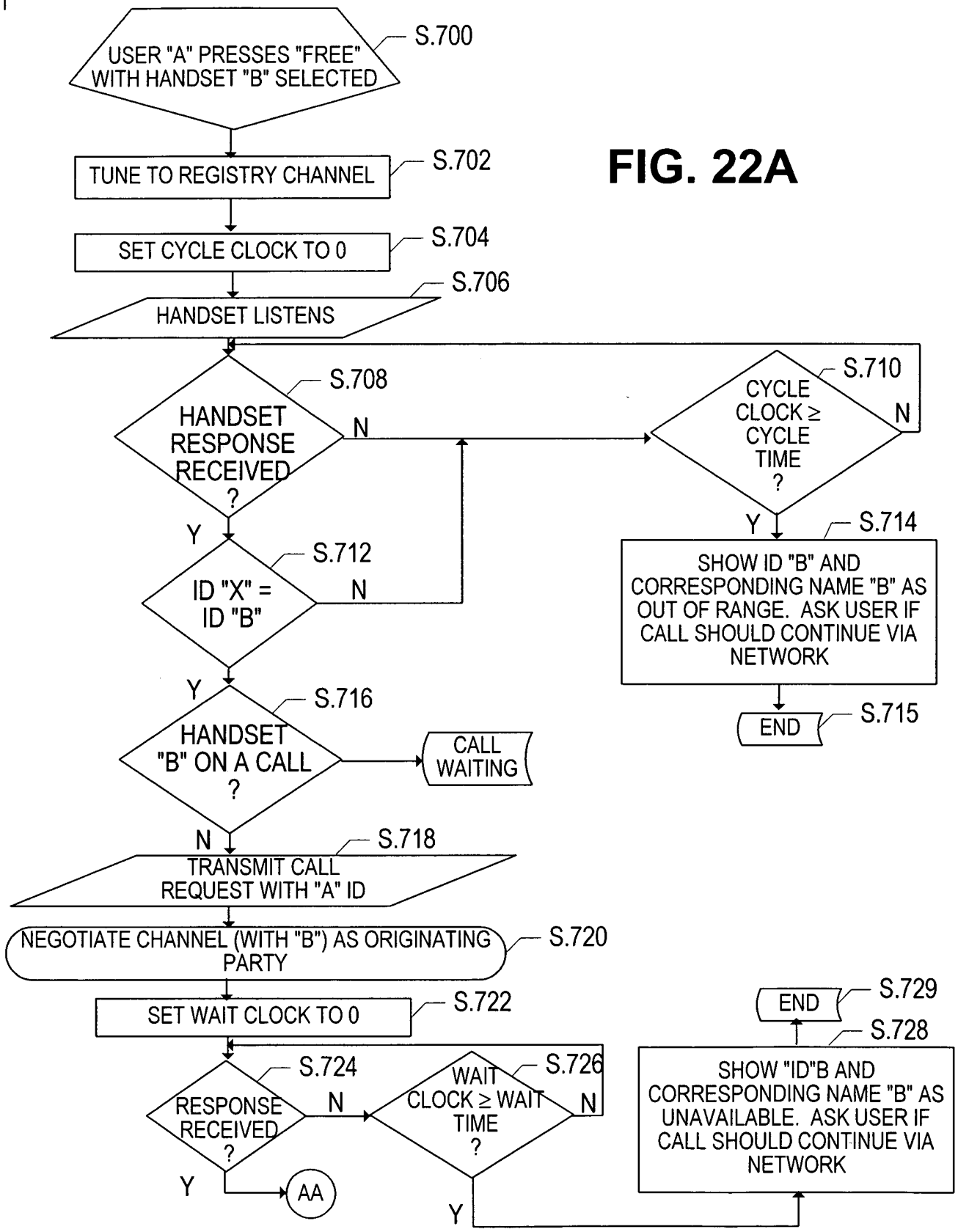

USER "A" PRESSES "FREE" WITH HANDSET "B" SELECTED
S.700
TUNE TO REGISTRY CHANNEL
S.702
SET CYCLE CLOCK TO 0
S.704
HANDSET LISTENS
S.706
HANDSET RESPONSE RECEIVED ?
S.708
N
Y
CYCLE CLOCK ≥ CYCLE TIME ?
S.710
N
Y
ID "X" = ID "B"
S.712
N
Y
SHOW ID "B" AND CORRESPONDING NAME "B" AS OUT OF RANGE. ASK USER IF CALL SHOULD CONTINUE VIA NETWORK
S.714
END
S.715
HANDSET "B" ON A CALL ?
S.716
CALL WAITING
N
Y
TRANSMIT CALL REQUEST WITH "A" ID
S.718
NEGOTIATE CHANNEL (WITH "B") AS ORIGINATING PARTY
S.720
SET WAIT CLOCK TO 0
S.722
RESPONSE RECEIVED ?
S.724
N
Y
WAIT CLOCK ≥ WAIT TIME ?
S.726
N
Y
AA
SHOW "ID"B AND CORRESPONDING NAME "B" AS UNAVAILABLE. ASK USER IF CALL SHOULD CONTINUE VIA NETWORK
S.728
END
S.729

FIG. 22A

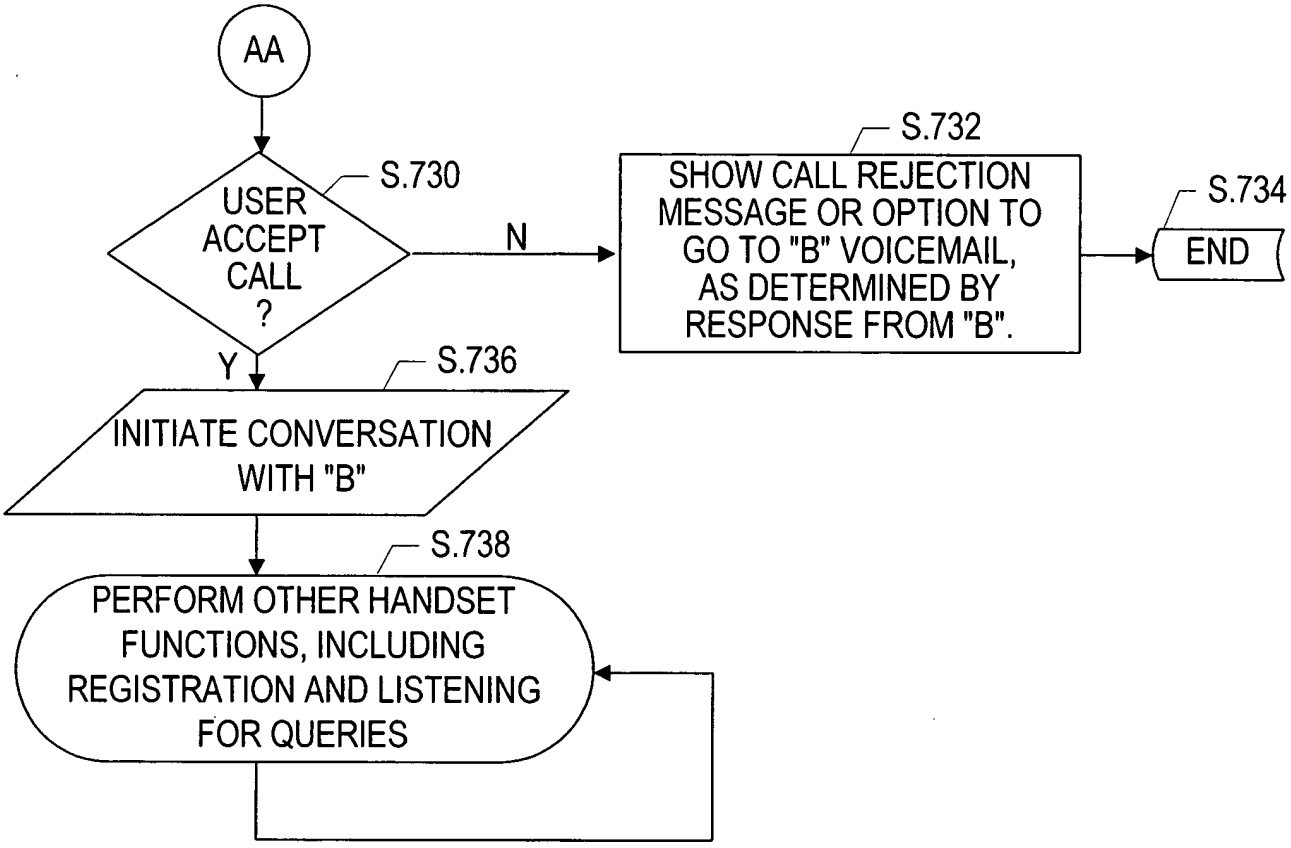

AA
S.730
USER ACCEPT CALL ?
N
S.732
SHOW CALL REJECTION MESSAGE OR OPTION TO GO TO "B" VOICEMAIL, AS DETERMINED BY RESPONSE FROM "B".
S.734
END
Y
S.736
INITIATE CONVERSATION WITH "B"
S.738
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING REGISTRATION AND LISTENING FOR QUERIES

FIG. 22B

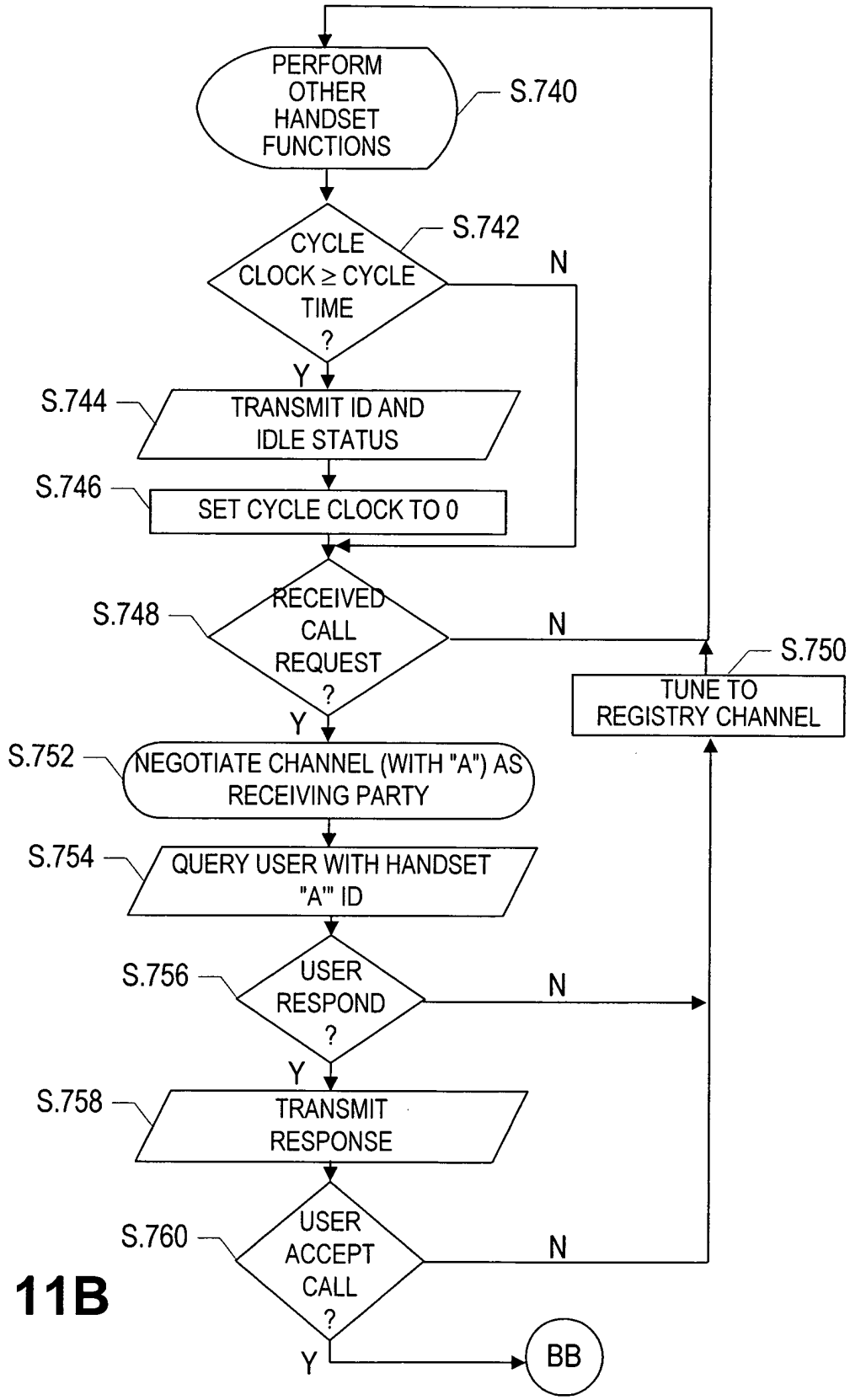

PERFORM OTHER HANDSET FUNCTIONS
S.740
CYCLE CLOCK ≥ CYCLE TIME ?
S.742
N
Y
S.744
TRANSMIT ID AND IDLE STATUS
S.746
SET CYCLE CLOCK TO 0
RECEIVED CALL REQUEST ?
S.748
N
Y
S.750
TUNE TO REGISTRY CHANNEL
S.752
NEGOTIATE CHANNEL (WITH "A") AS RECEIVING PARTY
S.754
QUERY USER WITH HANDSET "A'" ID
USER RESPOND ?
S.756
N
Y
S.758
TRANSMIT RESPONSE
USER ACCEPT CALL ?
S.760
N
Y
BB

FIG. 11B

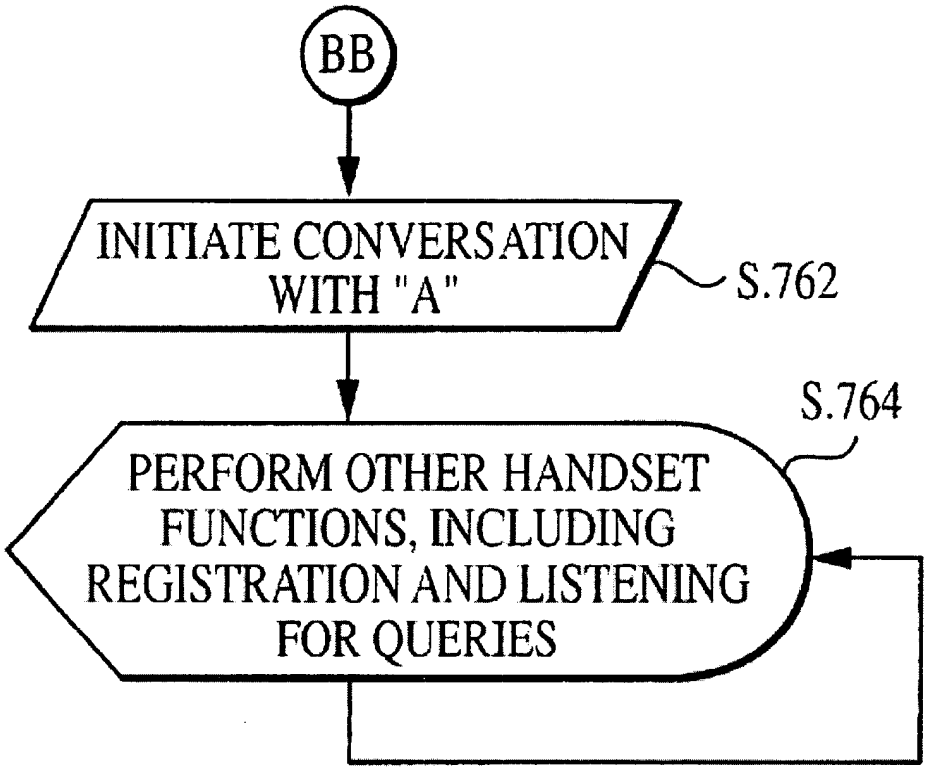

BB
INITIATE CONVERSATION WITH "A"
S.762
S.764
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING REGISTRATION AND LISTENING FOR QUERIES

FIG. 23B

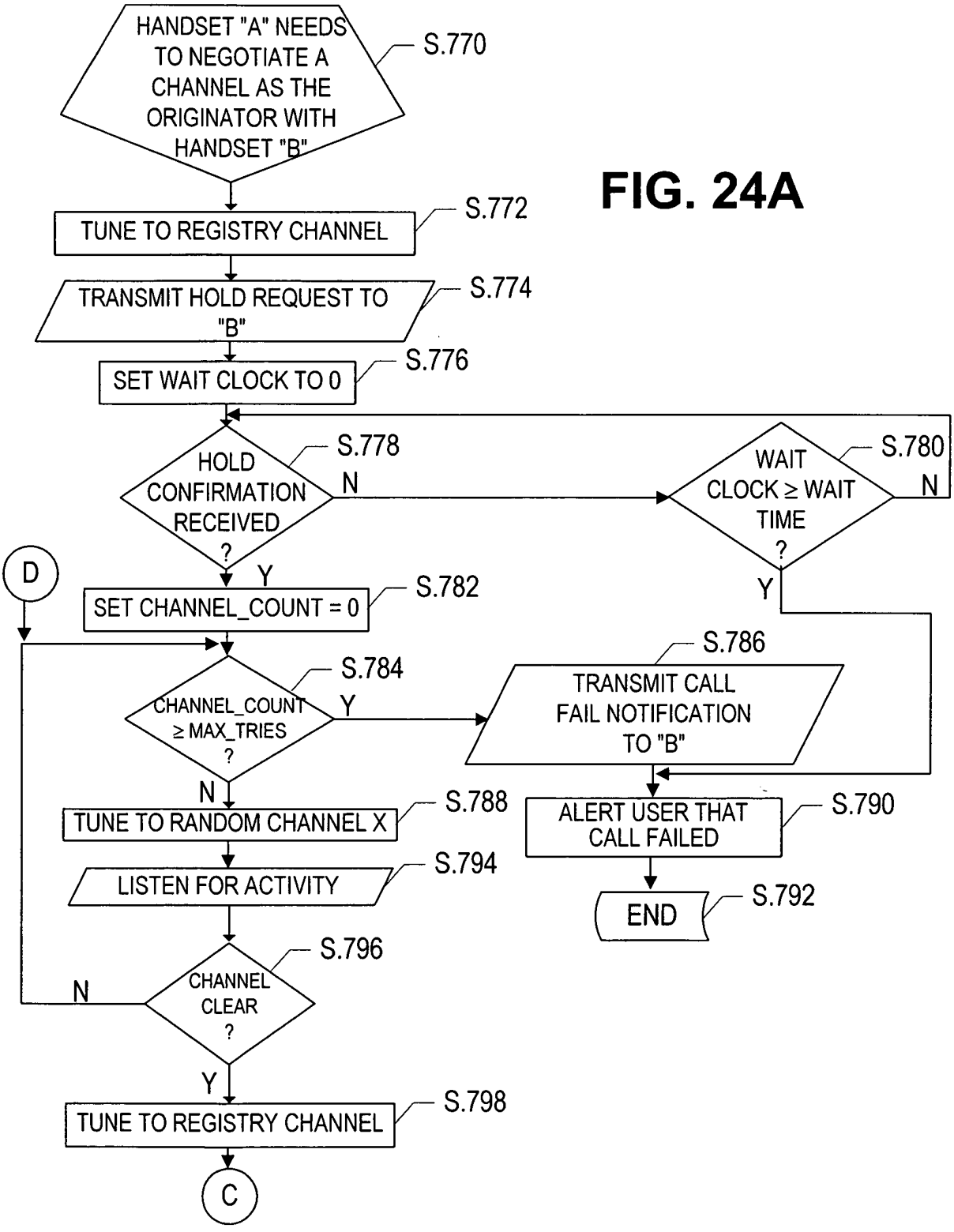

HANDSET "A" NEEDS TO NEGOTIATE A CHANNEL AS THE ORIGINATOR WITH HANDSET "B"
S.770
TUNE TO REGISTRY CHANNEL
S.772
TRANSMIT HOLD REQUEST TO "B"
S.774
SET WAIT CLOCK TO 0
S.776
HOLD CONFIRMATION RECEIVED ?
S.778
N
Y
WAIT CLOCK ≥ WAIT TIME ?
S.780
N
Y
D
SET CHANNEL_COUNT = 0
S.782
CHANNEL_COUNT ≥ MAX_TRIES ?
S.784
Y
N
TRANSMIT CALL FAIL NOTIFICATION TO "B"
S.786
TUNE TO RANDOM CHANNEL X
S.788
ALERT USER THAT CALL FAILED
S.790
LISTEN FOR ACTIVITY
S.794
END
S.792
CHANNEL CLEAR ?
S.796
N
Y
TUNE TO REGISTRY CHANNEL
S.798
C

FIG. 24A

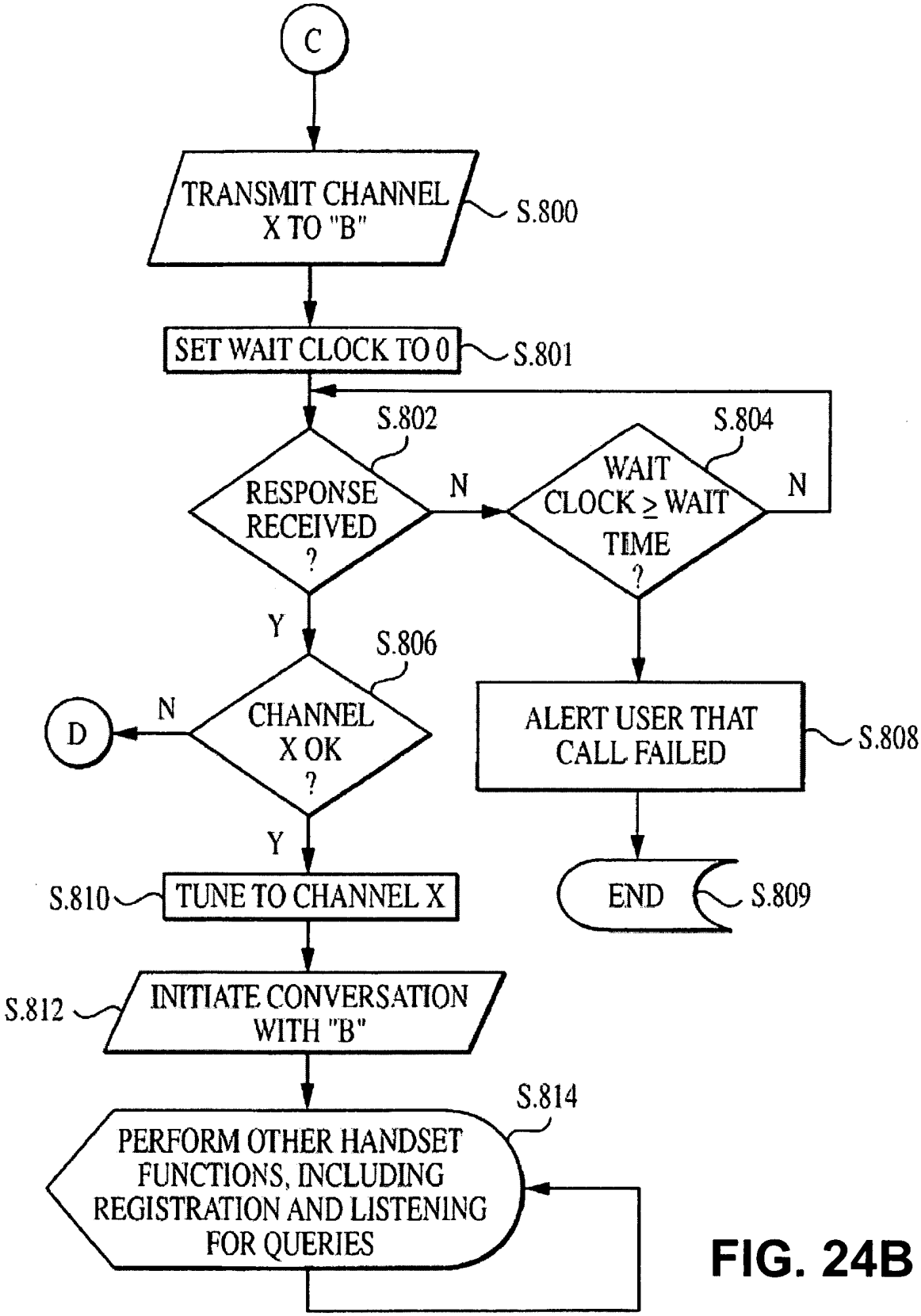

C
TRANSMIT CHANNEL X TO "B"
S.800
SET WAIT CLOCK TO 0
S.801
S.802
RESPONSE RECEIVED ?
N
S.804
WAIT CLOCK ≥ WAIT TIME ?
N
Y
S.806
CHANNEL X OK ?
N
D
Y
ALERT USER THAT CALL FAILED
S.808
END
S.809
S.810
TUNE TO CHANNEL X
S.812
INITIATE CONVERSATION WITH "B"
S.814
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING REGISTRATION AND LISTENING FOR QUERIES

FIG. 24B

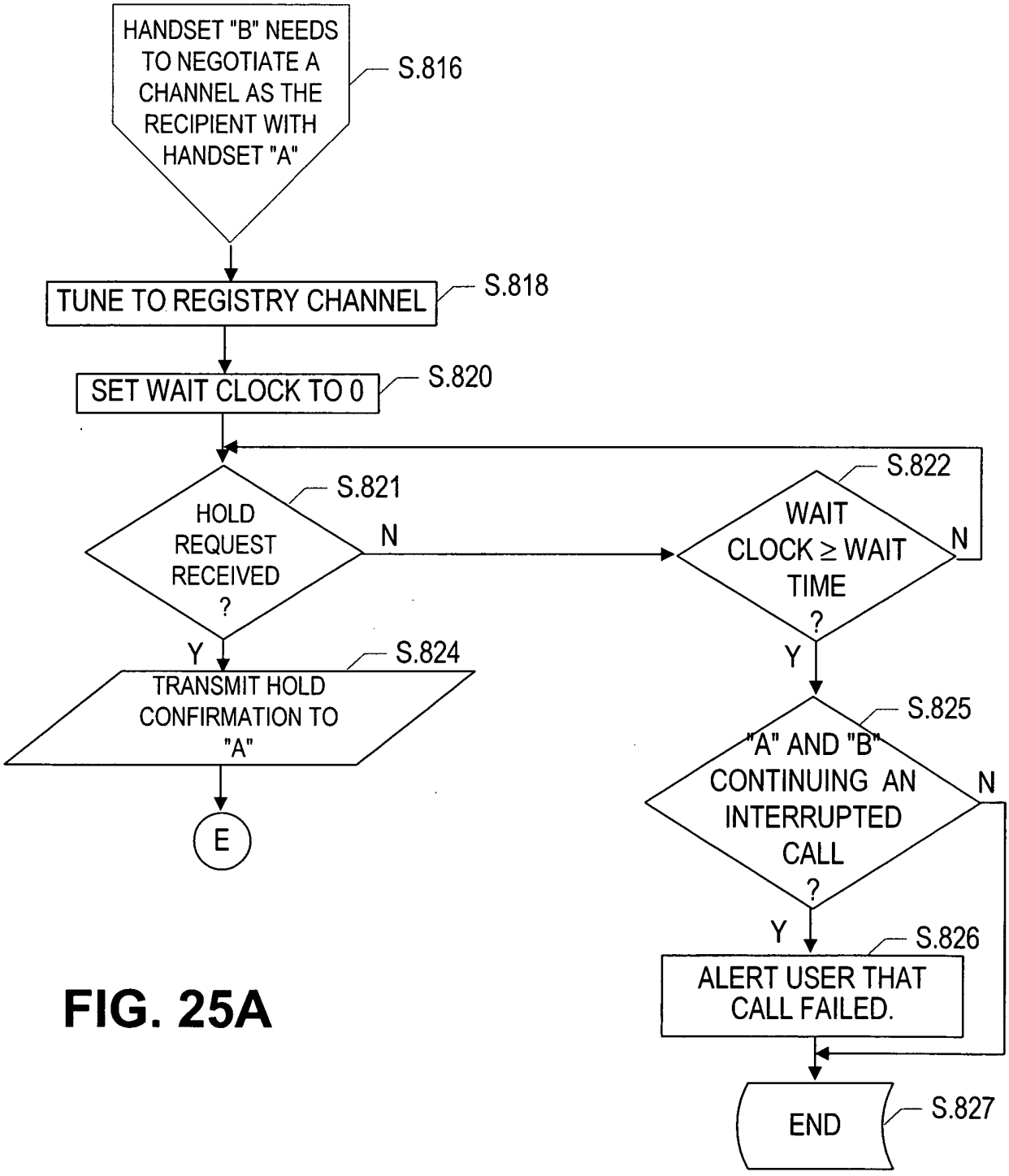

HANDSET "B" NEEDS TO NEGOTIATE A CHANNEL AS THE RECIPIENT WITH HANDSET "A"
S.816
TUNE TO REGISTRY CHANNEL
S.818
SET WAIT CLOCK TO 0
S.820
S.821
HOLD REQUEST RECEIVED ?
N
Y
S.822
WAIT CLOCK ≥ WAIT TIME ?
N
Y
S.824
TRANSMIT HOLD CONFIRMATION TO "A"
E
S.825
"A" AND "B" CONTINUING AN INTERRUPTED CALL ?
N
Y
S.826
ALERT USER THAT CALL FAILED.
END
S.827

FIG. 25A

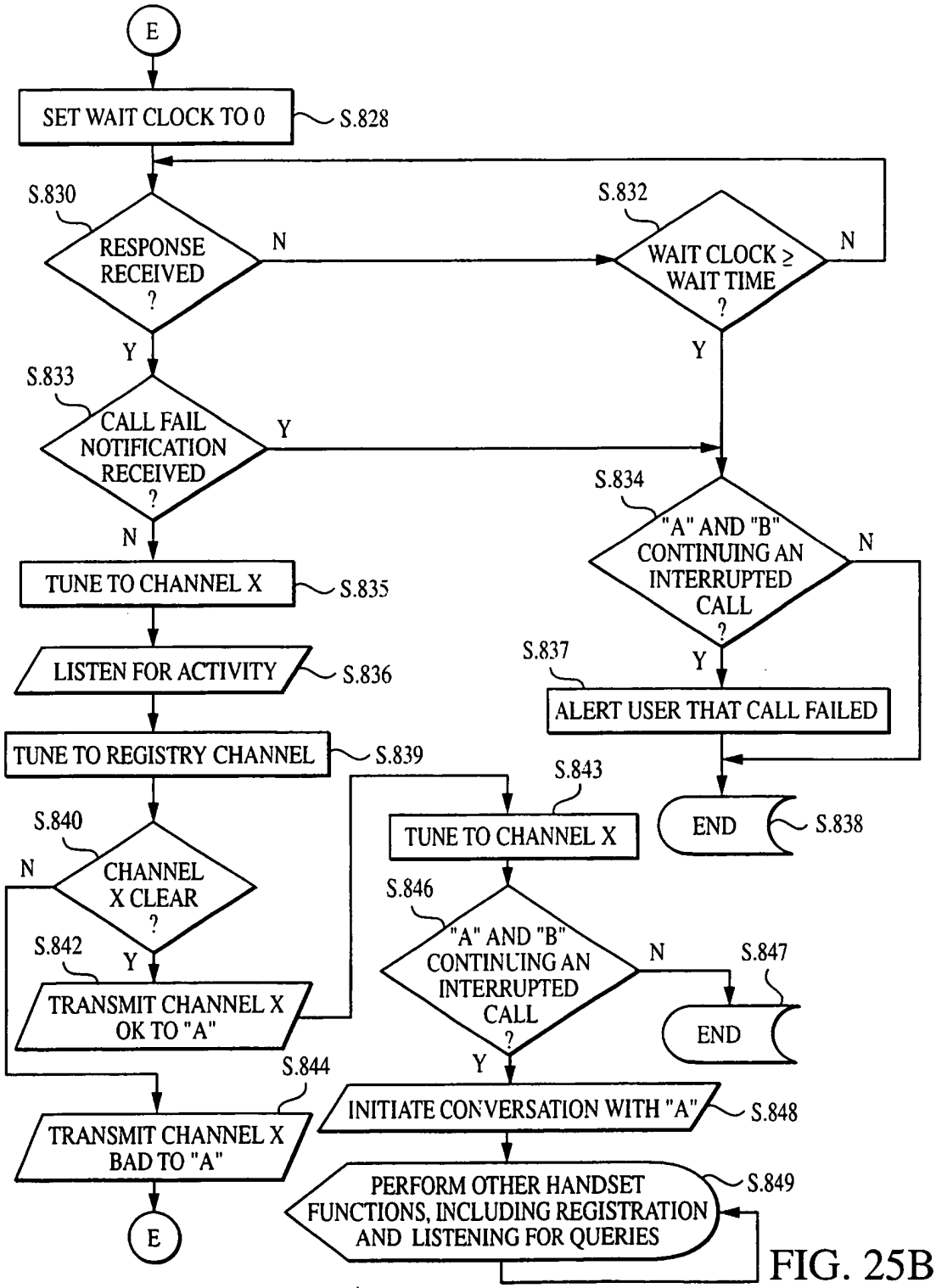

E
SET WAIT CLOCK TO 0
S.828
S.830
RESPONSE RECEIVED ?
N
Y
S.832
WAIT CLOCK ≥ WAIT TIME ?
N
Y
S.833
CALL FAIL NOTIFICATION RECEIVED ?
Y
N
S.834
"A" AND "B" CONTINUING AN INTERRUPTED CALL ?
N
Y
S.837
ALERT USER THAT CALL FAILED
TUNE TO CHANNEL X
S.835
LISTEN FOR ACTIVITY
S.836
TUNE TO REGISTRY CHANNEL
S.839
END
S.838
S.840
CHANNEL X CLEAR ?
N
Y
S.842
TRANSMIT CHANNEL X OK TO "A"
S.843
TUNE TO CHANNEL X
S.846
"A" AND "B" CONTINUING AN INTERRUPTED CALL ?
N
S.847
END
Y
S.844
TRANSMIT CHANNEL X BAD TO "A"
INITIATE CONVERSATION WITH "A"
S.848
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING REGISTRATION AND LISTENING FOR QUERIES
S.849
E

FIG. 25B

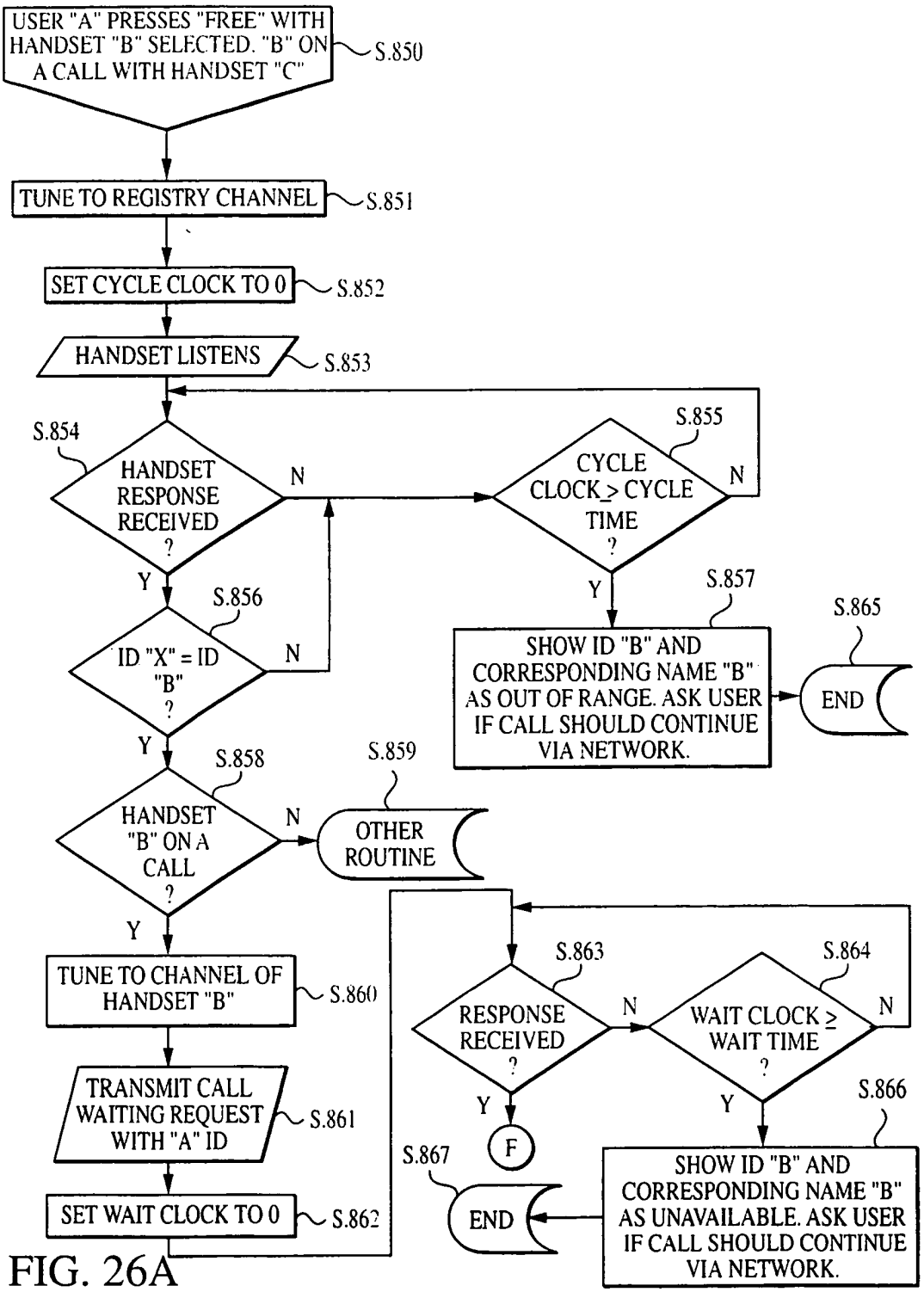

USER "A" PRESSES "FREE" WITH HANDSET "B" SELECTED. "B" ON A CALL WITH HANDSET "C"
S.850
TUNE TO REGISTRY CHANNEL
S.851
SET CYCLE CLOCK TO 0
S.852
HANDSET LISTENS
S.853
S.854
HANDSET RESPONSE RECEIVED ?
N
Y
S.855
CYCLE CLOCK ≥ CYCLE TIME ?
N
Y
S.856
ID "X" = ID "B" ?
N
Y
S.857
SHOW ID "B" AND CORRESPONDING NAME "B" AS OUT OF RANGE. ASK USER IF CALL SHOULD CONTINUE VIA NETWORK.
S.865
END
S.858
HANDSET "B" ON A CALL ?
N
Y
S.859
OTHER ROUTINE
TUNE TO CHANNEL OF HANDSET "B"
S.860
TRANSMIT CALL WAITING REQUEST WITH "A" ID
S.861
SET WAIT CLOCK TO 0
S.862
S.863
RESPONSE RECEIVED ?
N
Y
S.864
WAIT CLOCK ≥ WAIT TIME ?
N
Y
F
S.866
SHOW ID "B" AND CORRESPONDING NAME "B" AS UNAVAILABLE. ASK USER IF CALL SHOULD CONTINUE VIA NETWORK.
S.867
END

FIG. 26A

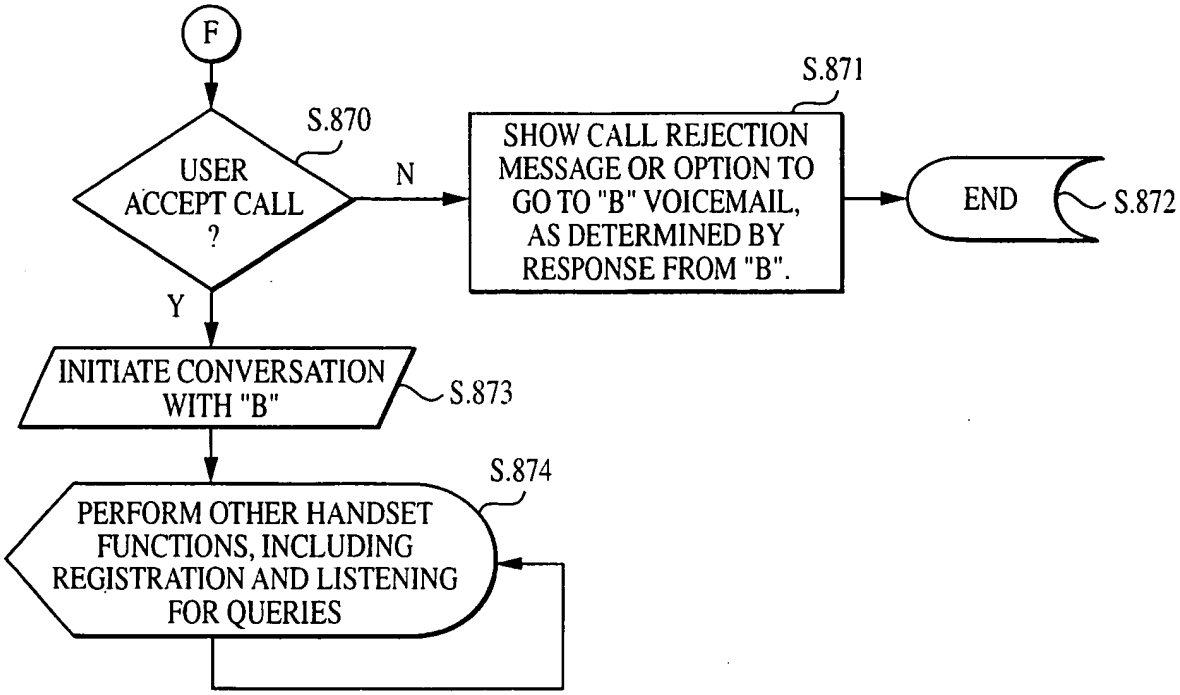

F
S.870
USER ACCEPT CALL ?
N
S.871
SHOW CALL REJECTION MESSAGE OR OPTION TO GO TO "B" VOICEMAIL, AS DETERMINED BY RESPONSE FROM "B".
END
S.872
Y
INITIATE CONVERSATION WITH "B"
S.873
S.874
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING REGISTRATION AND LISTENING FOR QUERIES

FIG. 26B

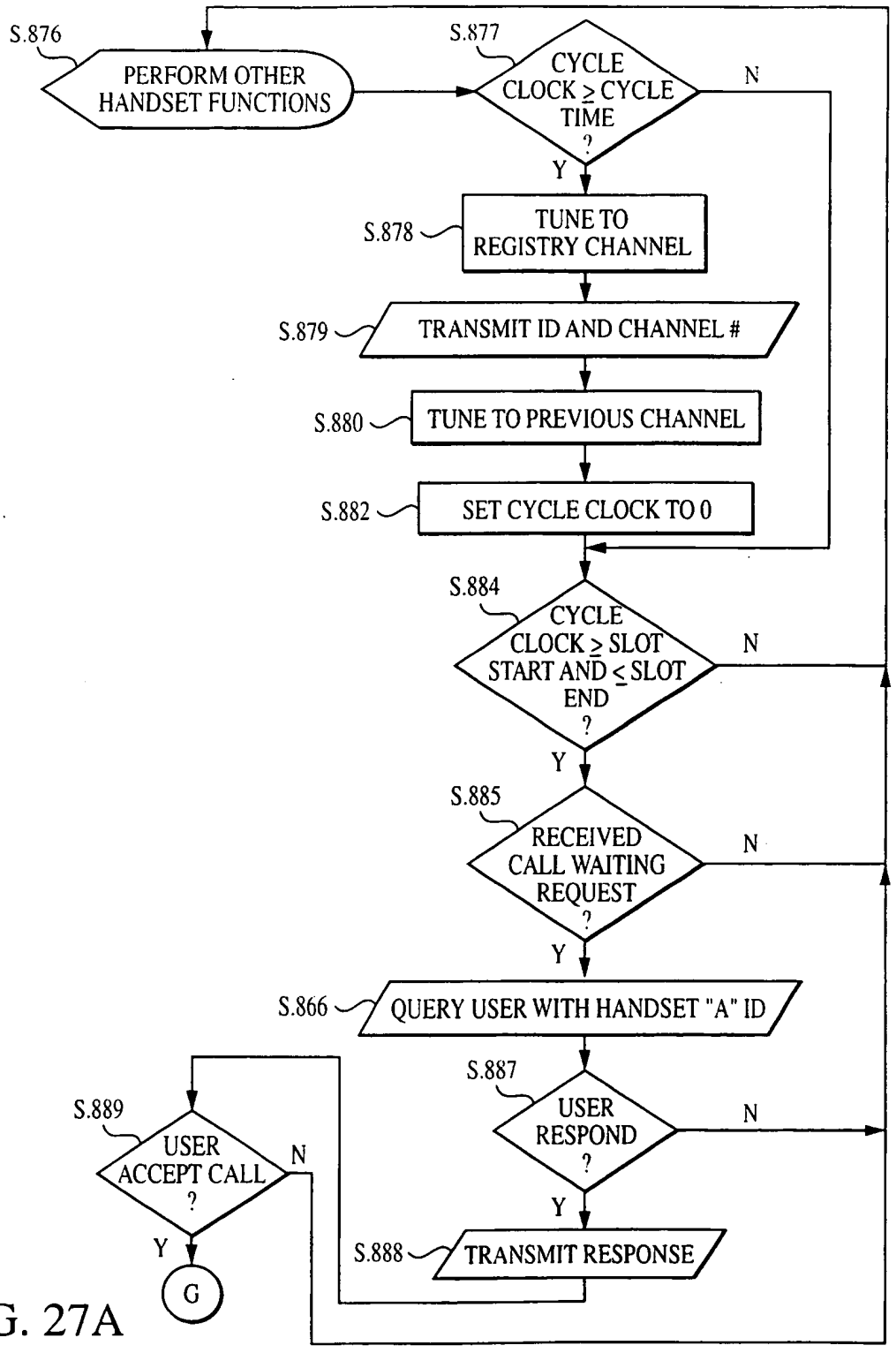

S.876
PERFORM OTHER HANDSET FUNCTIONS
S.877
CYCLE CLOCK ≥ CYCLE TIME ?
N
Y
S.878
TUNE TO REGISTRY CHANNEL
S.879
TRANSMIT ID AND CHANNEL #
S.880
TUNE TO PREVIOUS CHANNEL
S.882
SET CYCLE CLOCK TO 0
S.884
CYCLE CLOCK ≥ SLOT START AND ≤ SLOT END ?
N
Y
S.885
RECEIVED CALL WAITING REQUEST ?
N
Y
S.866
QUERY USER WITH HANDSET "A" ID
S.887
USER RESPOND ?
N
Y
S.888
TRANSMIT RESPONSE
S.889
USER ACCEPT CALL ?
N
Y
G

FIG. 27A

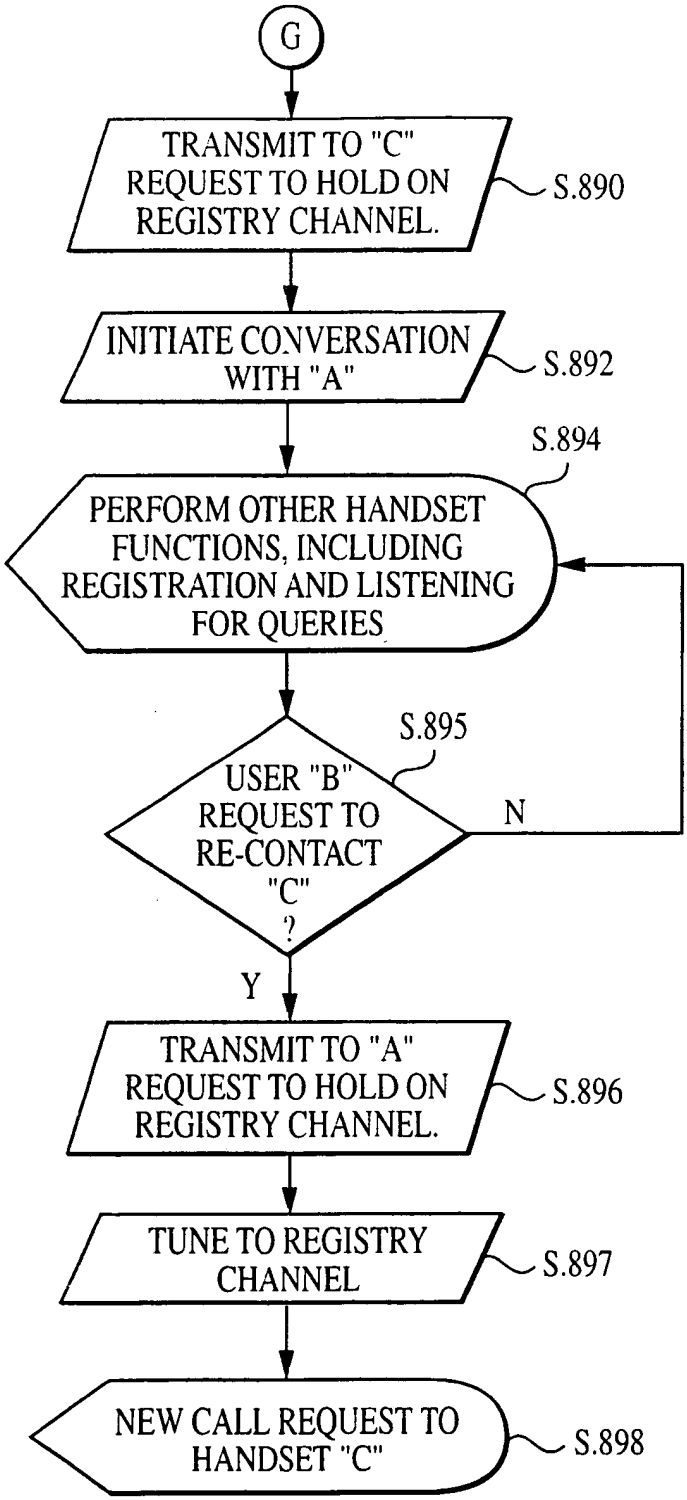

G
TRANSMIT TO "C" REQUEST TO HOLD ON REGISTRY CHANNEL.
S.890
INITIATE CONVERSATION WITH "A"
S.892
S.894
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING REGISTRATION AND LISTENING FOR QUERIES
S.895
USER "B" REQUEST TO RE-CONTACT "C" ?
N
Y
TRANSMIT TO "A" REQUEST TO HOLD ON REGISTRY CHANNEL.
S.896
TUNE TO REGISTRY CHANNEL
S.897
NEW CALL REQUEST TO HANDSET "C"
S.898

FIG. 27B

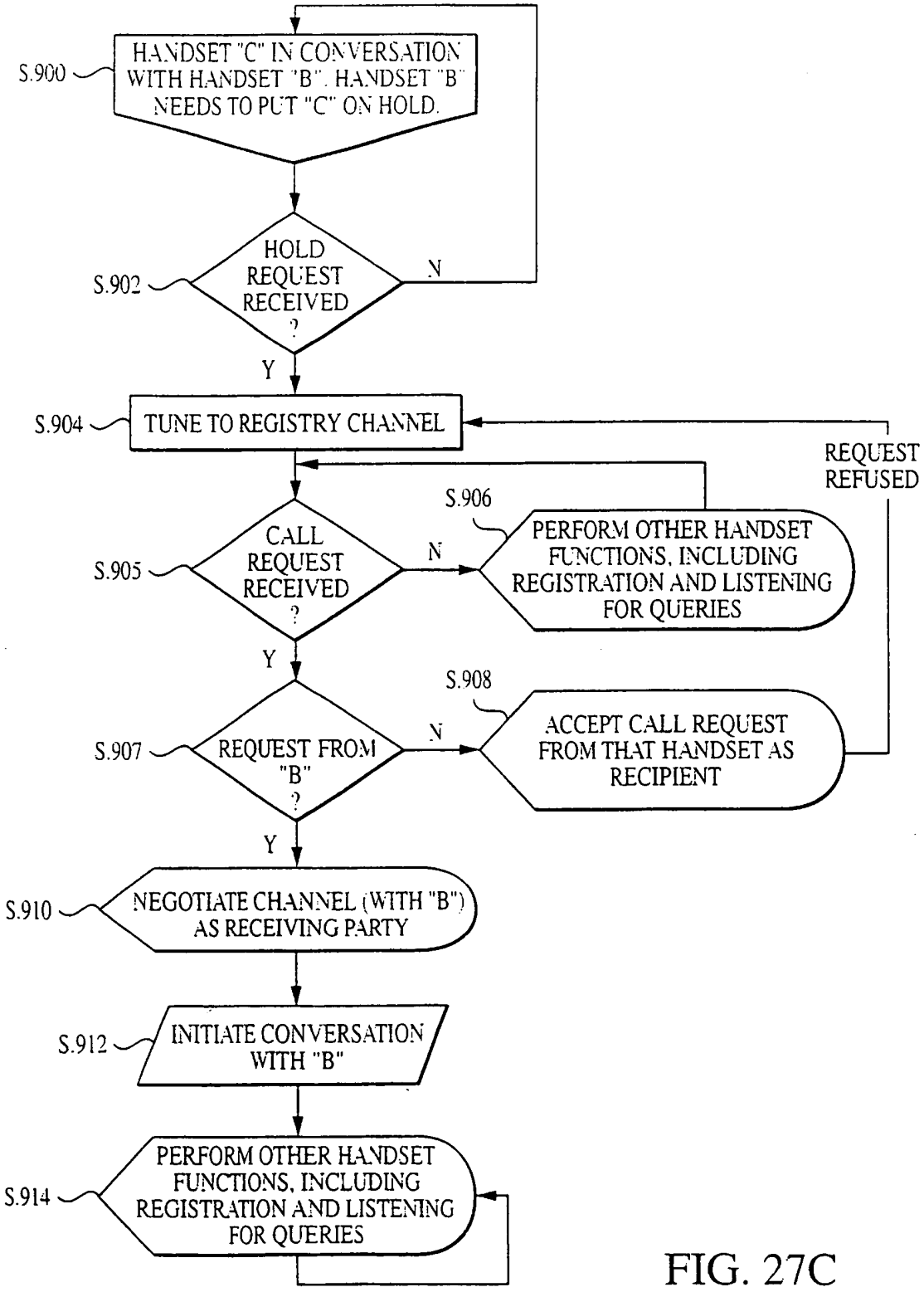

S.900
HANDSET "C" IN CONVERSATION WITH HANDSET "B". HANDSET "B" NEEDS TO PUT "C" ON HOLD.
S.902
HOLD REQUEST RECEIVED ?
N
Y
S.904
TUNE TO REGISTRY CHANNEL
REQUEST REFUSED
S.906
S.905
CALL REQUEST RECEIVED ?
N
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING REGISTRATION AND LISTENING FOR QUERIES
Y
S.908
S.907
REQUEST FROM "B" ?
N
ACCEPT CALL REQUEST FROM THAT HANDSET AS RECIPIENT
Y
S.910
NEGOTIATE CHANNEL (WITH "B") AS RECEIVING PARTY
S.912
INITIATE CONVERSATION WITH "B"
S.914
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING REGISTRATION AND LISTENING FOR QUERIES

FIG. 27C

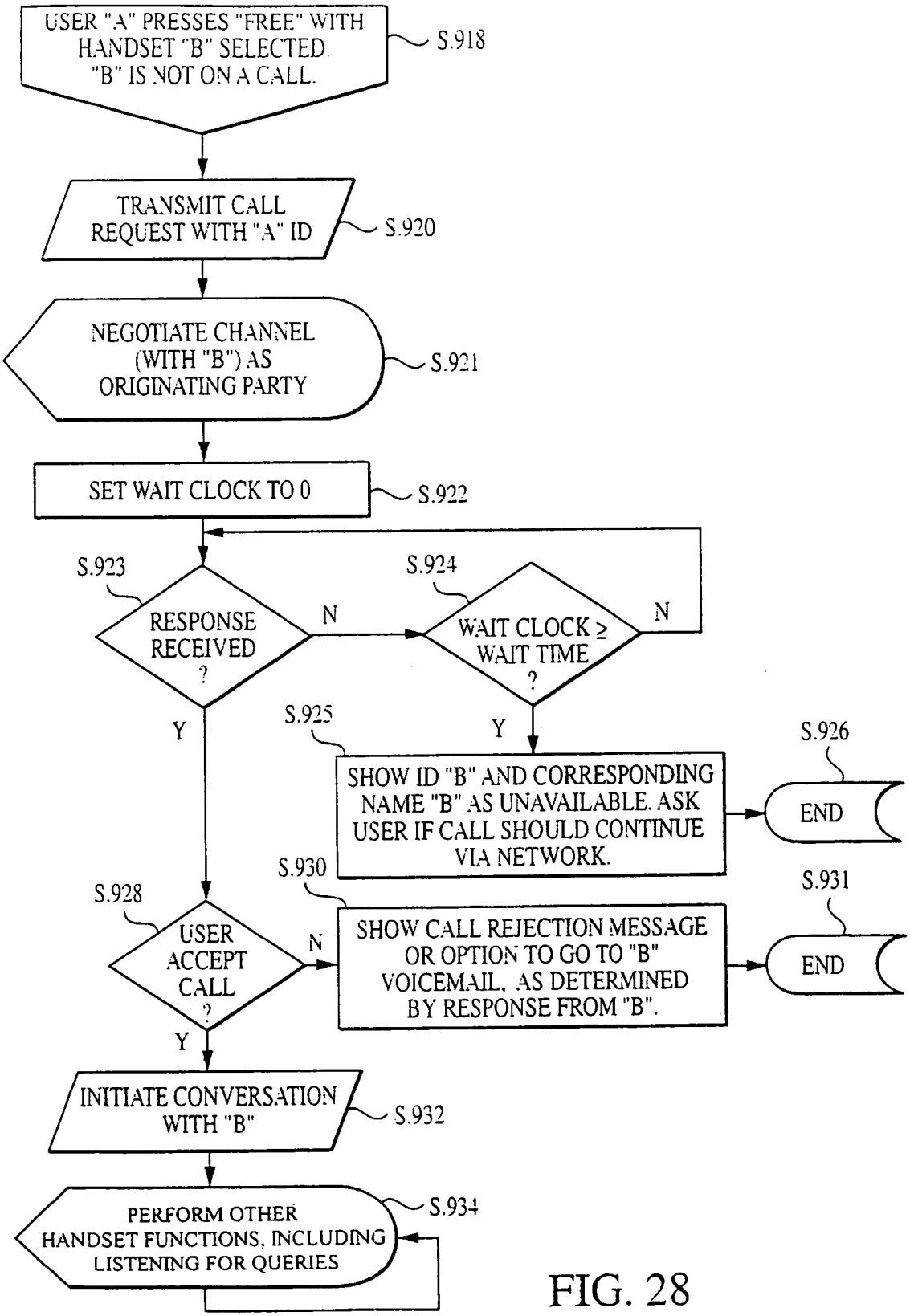

USER "A" PRESSES "FREE" WITH HANDSET "B" SELECTED. "B" IS NOT ON A CALL.
S.918
TRANSMIT CALL REQUEST WITH "A" ID
S.920
NEGOTIATE CHANNEL (WITH "B") AS ORIGINATING PARTY
S.921
SET WAIT CLOCK TO 0
S.922
S.923
RESPONSE RECEIVED ?
N
S.924
WAIT CLOCK ≥ WAIT TIME ?
N
Y
Y
S.925
SHOW ID "B" AND CORRESPONDING NAME "B" AS UNAVAILABLE. ASK USER IF CALL SHOULD CONTINUE VIA NETWORK.
S.926
END
S.928
USER ACCEPT CALL ?
N
S.930
SHOW CALL REJECTION MESSAGE OR OPTION TO GO TO "B" VOICEMAIL, AS DETERMINED BY RESPONSE FROM "B".
S.931
END
Y
INITIATE CONVERSATION WITH "B"
S.932
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING LISTENING FOR QUERIES
S.934

FIG. 28

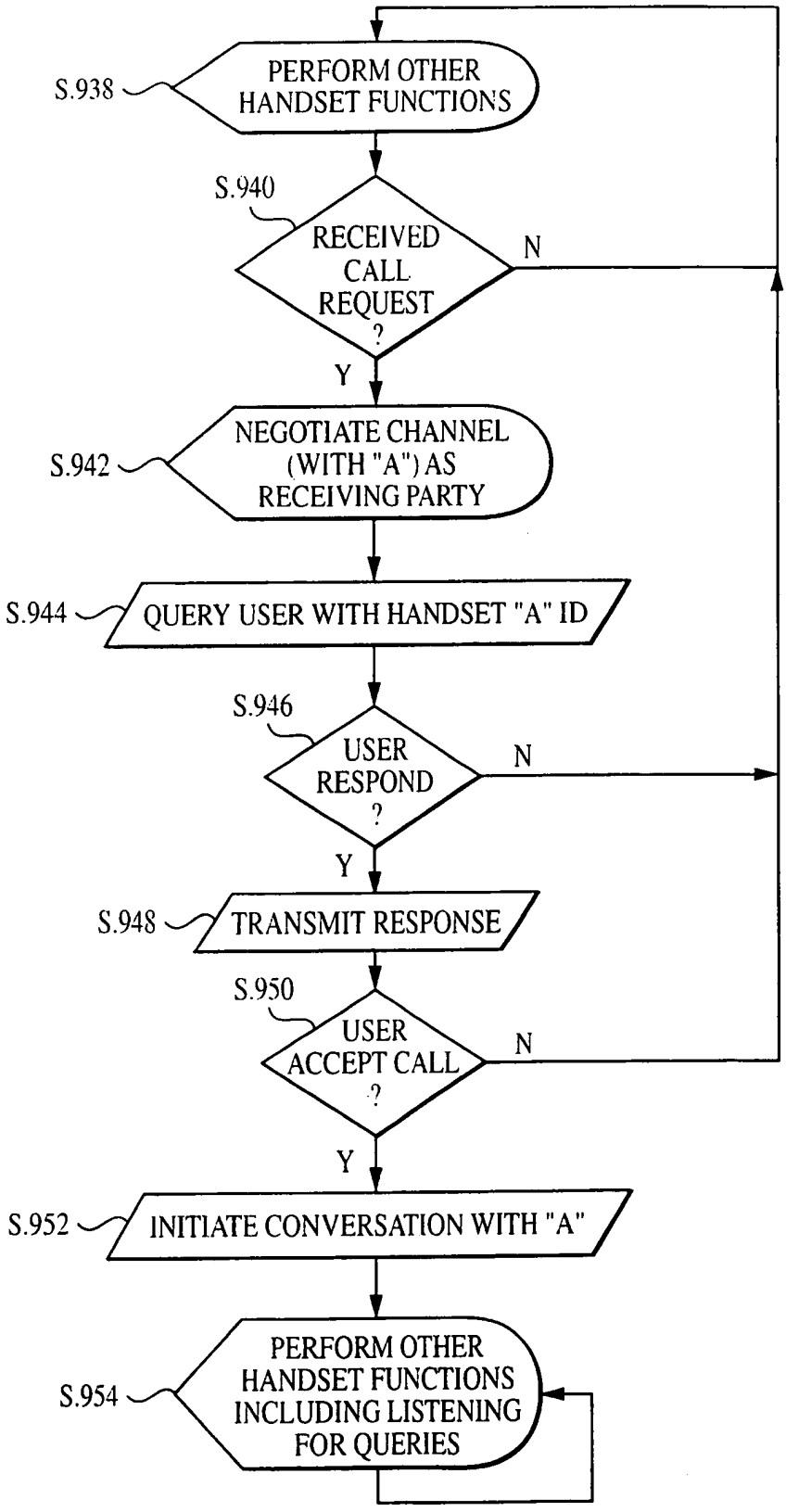

S.938
PERFORM OTHER HANDSET FUNCTIONS
S.940
RECEIVED CALL REQUEST ?
N
Y
S.942
NEGOTIATE CHANNEL (WITH "A") AS RECEIVING PARTY
S.944
QUERY USER WITH HANDSET "A" ID
S.946
USER RESPOND ?
N
Y
S.948
TRANSMIT RESPONSE
S.950
USER ACCEPT CALL ?
N
Y
S.952
INITIATE CONVERSATION WITH "A"
S.954
PERFORM OTHER HANDSET FUNCTIONS INCLUDING LISTENING FOR QUERIES

FIG. 29

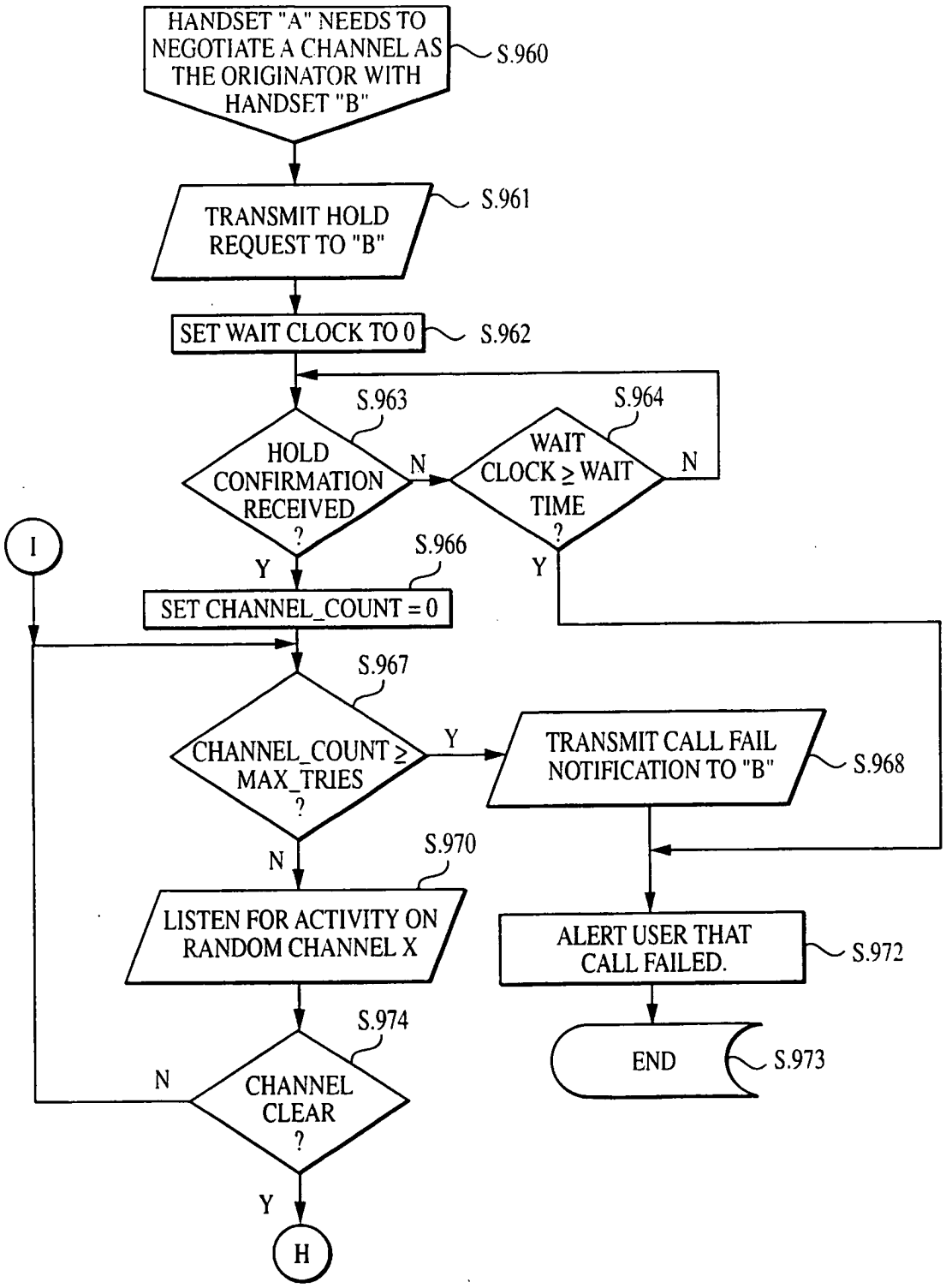

HANDSET "A" NEEDS TO NEGOTIATE A CHANNEL AS THE ORIGINATOR WITH HANDSET "B"
S.960
TRANSMIT HOLD REQUEST TO "B"
S.961
SET WAIT CLOCK TO 0
S.962
S.963
HOLD CONFIRMATION RECEIVED ?
N
S.964
WAIT CLOCK ≥ WAIT TIME ?
N
Y
Y
I
S.966
SET CHANNEL_COUNT = 0
S.967
CHANNEL_COUNT ≥ MAX_TRIES ?
Y
TRANSMIT CALL FAIL NOTIFICATION TO "B"
S.968
N
S.970
LISTEN FOR ACTIVITY ON RANDOM CHANNEL X
ALERT USER THAT CALL FAILED.
S.972
END
S.973
S.974
CHANNEL CLEAR ?
N
Y
H

FIG. 30A

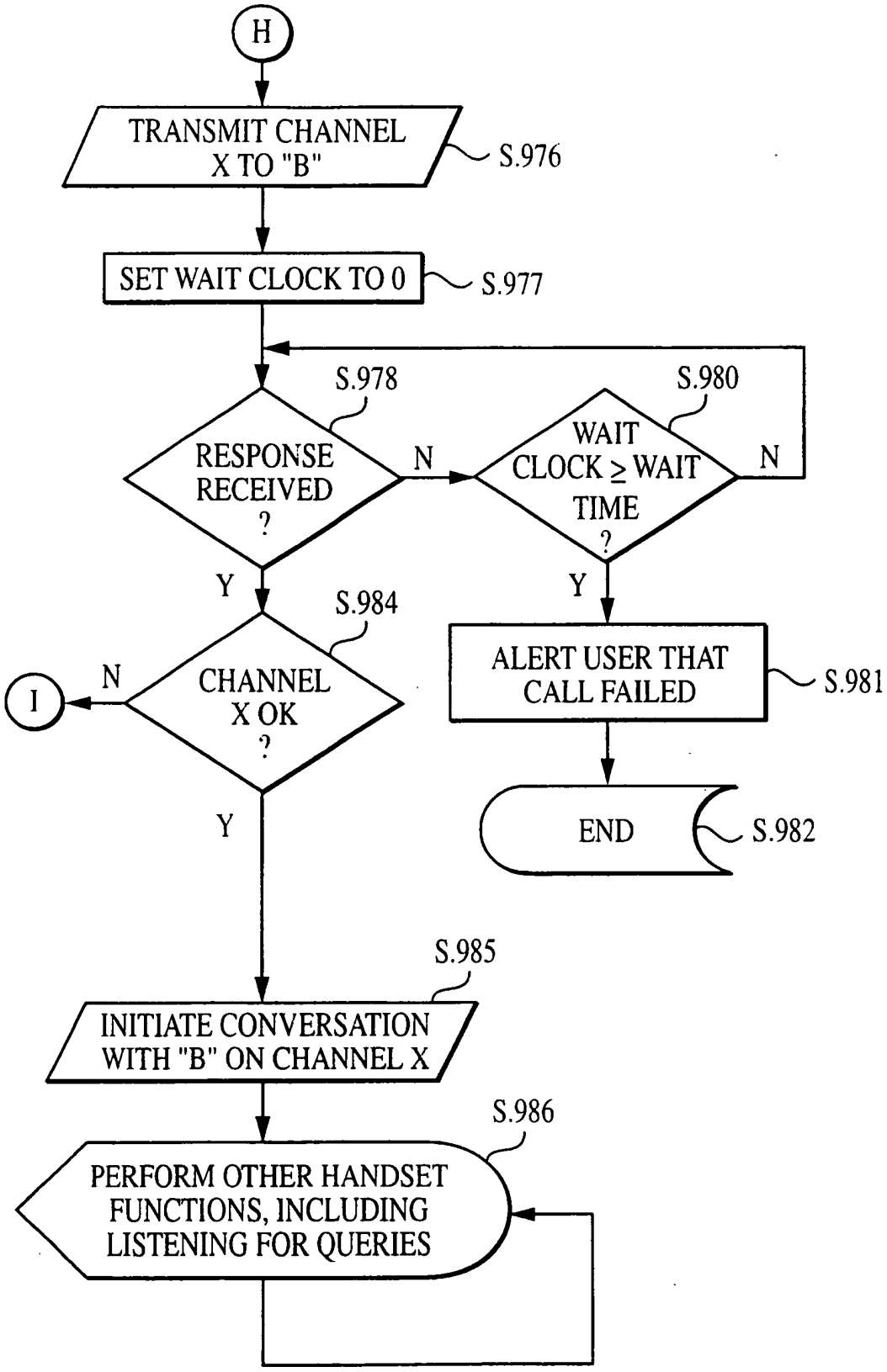

H
TRANSMIT CHANNEL X TO "B"
S.976
SET WAIT CLOCK TO 0
S.977
S.978
RESPONSE RECEIVED ?
N
S.980
WAIT CLOCK ≥ WAIT TIME ?
N
Y
Y
S.984
CHANNEL X OK ?
N
I
ALERT USER THAT CALL FAILED
S.981
END
S.982
Y
S.985
INITIATE CONVERSATION WITH "B" ON CHANNEL X
S.986
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING LISTENING FOR QUERIES

FIG. 30B

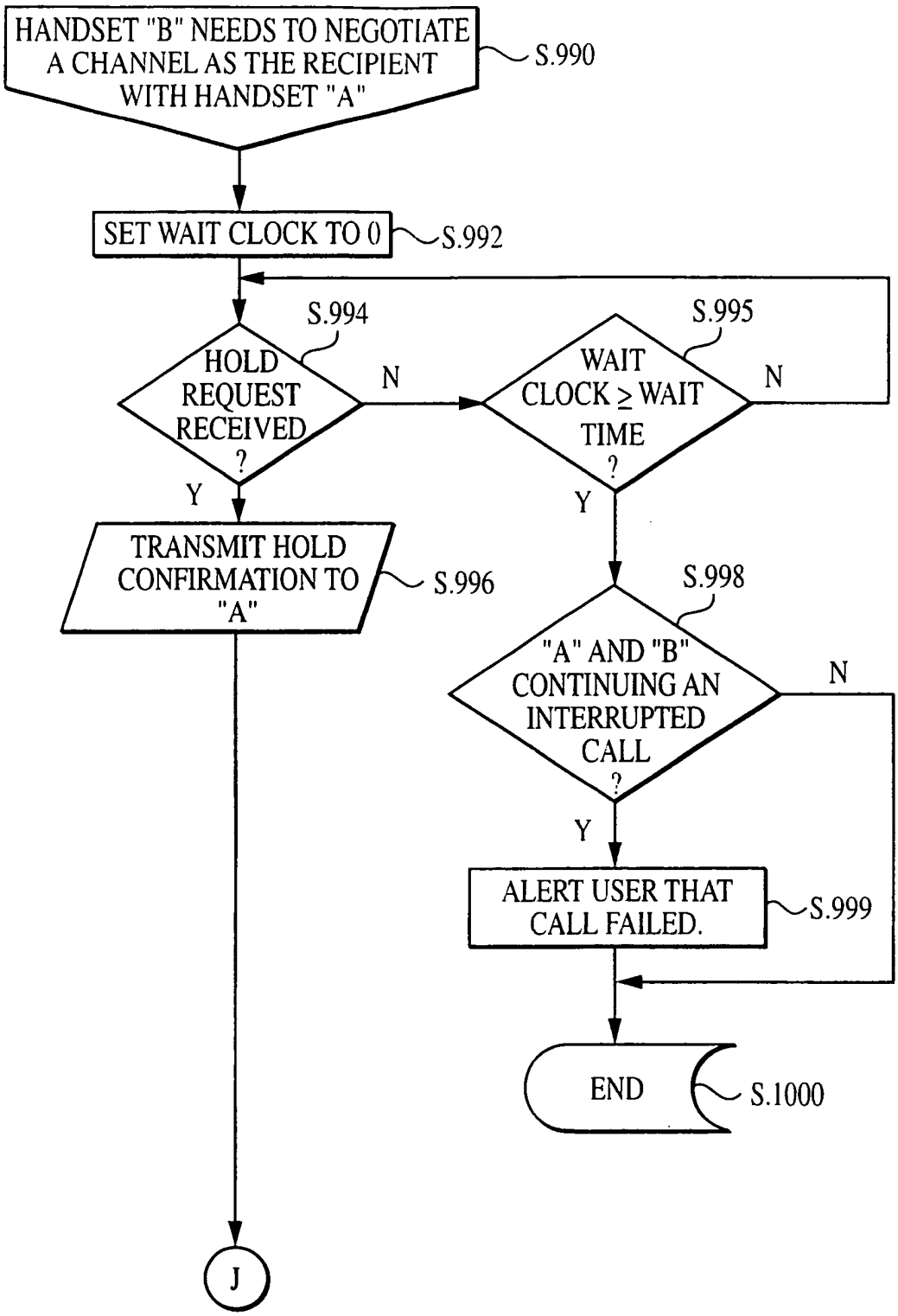

HANDSET "B" NEEDS TO NEGOTIATE A CHANNEL AS THE RECIPIENT WITH HANDSET "A"
S.990
SET WAIT CLOCK TO 0
S.992
S.994
HOLD REQUEST RECEIVED ?
N
Y
S.995
WAIT CLOCK ≥ WAIT TIME ?
N
Y
TRANSMIT HOLD CONFIRMATION TO "A"
S.996
S.998
"A" AND "B" CONTINUING AN INTERRUPTED CALL ?
N
Y
ALERT USER THAT CALL FAILED.
S.999
END
S.1000
J

FIG. 31A

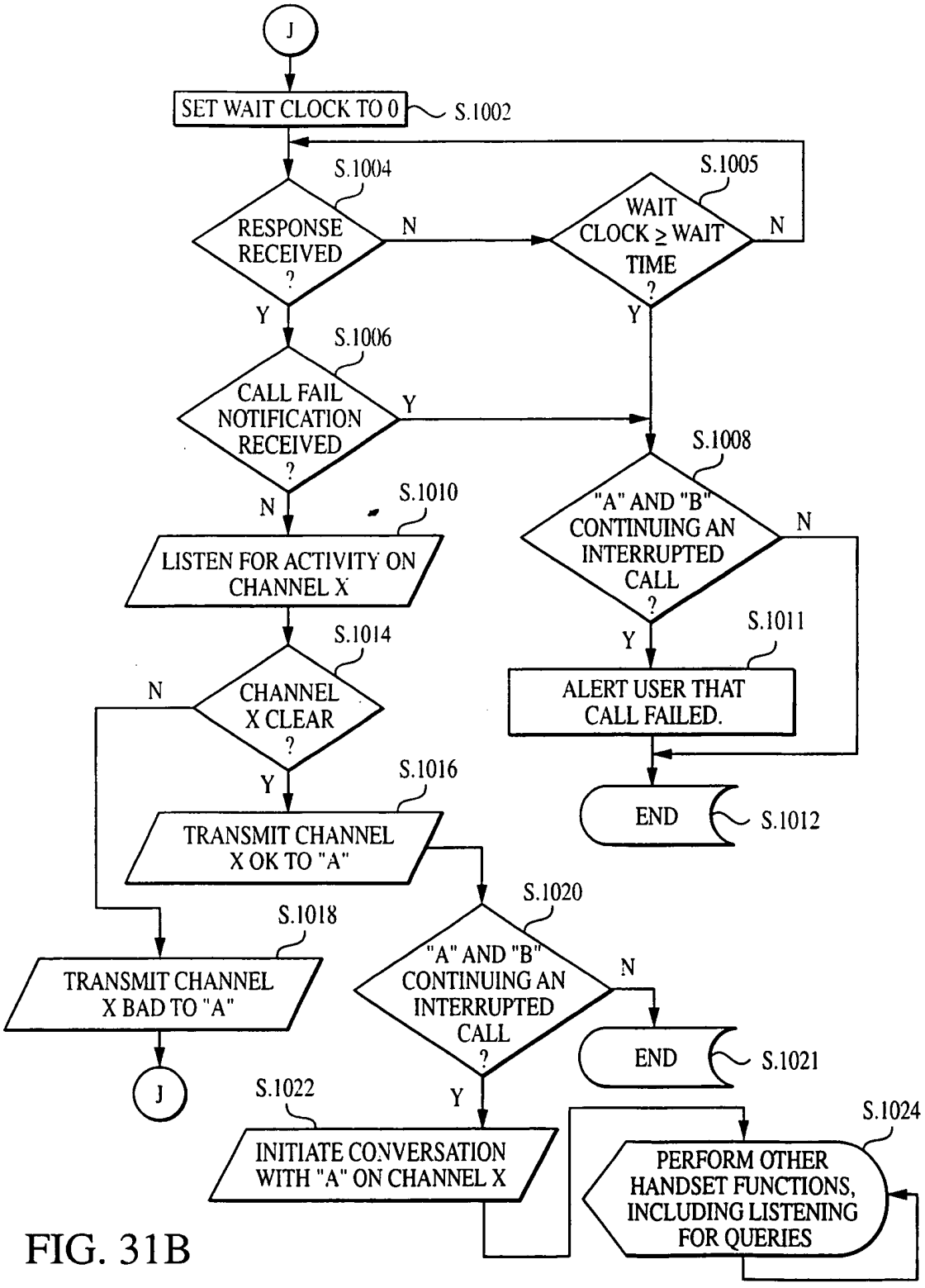

J
SET WAIT CLOCK TO 0
S.1002
S.1004
RESPONSE RECEIVED ?
N
S.1005
WAIT CLOCK ≥ WAIT TIME ?
N
Y
Y
S.1006
CALL FAIL NOTIFICATION RECEIVED ?
Y
N
S.1008
"A" AND "B" CONTINUING AN INTERRUPTED CALL ?
N
S.1010
LISTEN FOR ACTIVITY ON CHANNEL X
Y
S.1011
ALERT USER THAT CALL FAILED.
S.1014
CHANNEL X CLEAR ?
N
Y
END
S.1012
S.1016
TRANSMIT CHANNEL X OK TO "A"
S.1020
"A" AND "B" CONTINUING AN INTERRUPTED CALL ?
N
S.1018
TRANSMIT CHANNEL X BAD TO "A"
END
S.1021
J
S.1022
Y
S.1024
INITIATE CONVERSATION WITH "A" ON CHANNEL X
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING LISTENING FOR QUERIES

FIG. 31B

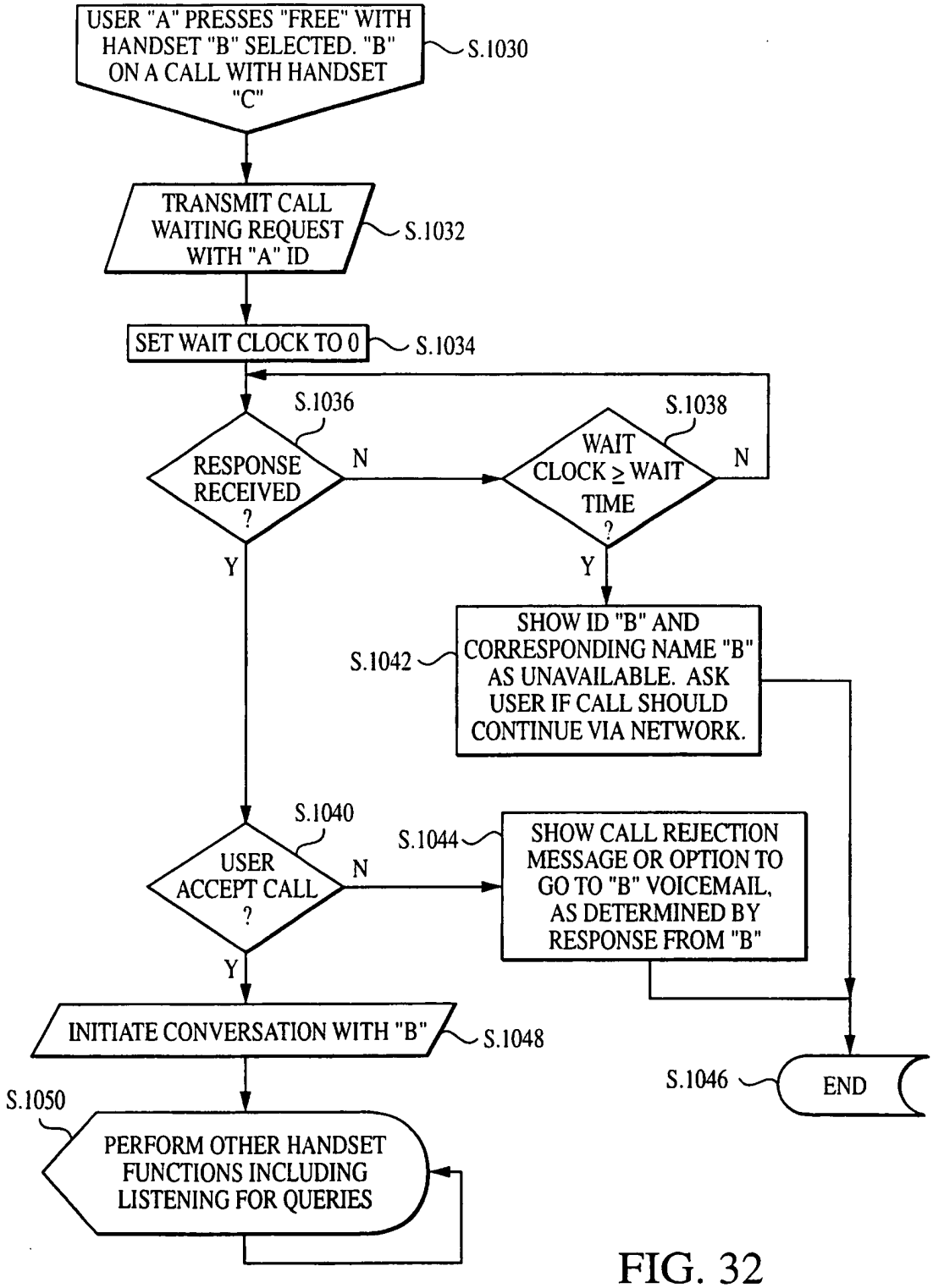

USER "A" PRESSES "FREE" WITH HANDSET "B" SELECTED. "B" ON A CALL WITH HANDSET "C"
S.1030
TRANSMIT CALL WAITING REQUEST WITH "A" ID
S.1032
SET WAIT CLOCK TO 0
S.1034
S.1036
RESPONSE RECEIVED ?
N
Y
S.1038
WAIT CLOCK ≥ WAIT TIME ?
N
Y
SHOW ID "B" AND CORRESPONDING NAME "B" AS UNAVAILABLE. ASK USER IF CALL SHOULD CONTINUE VIA NETWORK.
S.1042
S.1040
USER ACCEPT CALL ?
N
Y
S.1044
SHOW CALL REJECTION MESSAGE OR OPTION TO GO TO "B" VOICEMAIL, AS DETERMINED BY RESPONSE FROM "B"
INITIATE CONVERSATION WITH "B"
S.1048
S.1046
END
S.1050
PERFORM OTHER HANDSET FUNCTIONS INCLUDING LISTENING FOR QUERIES

FIG. 32

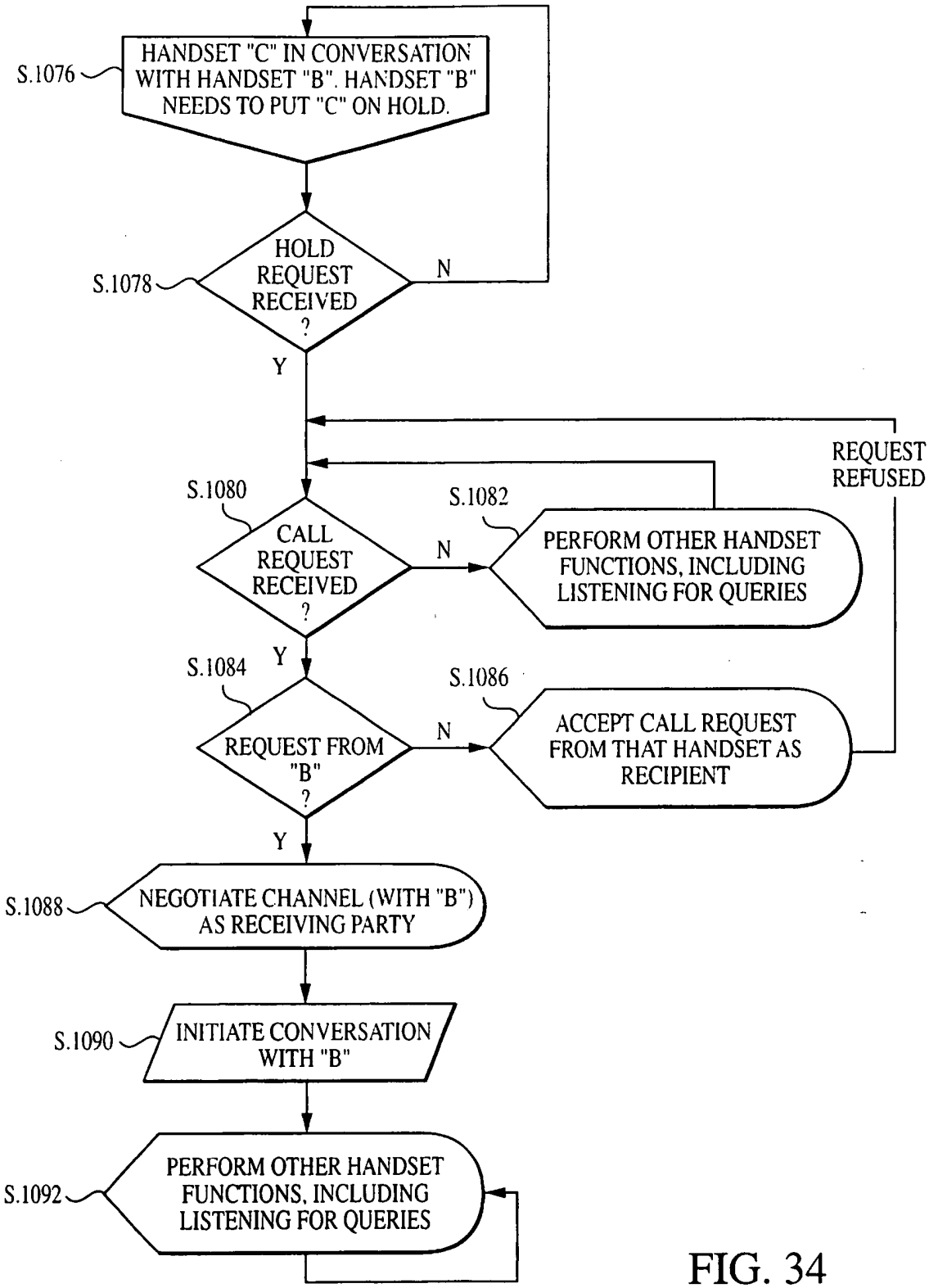

S.1076
HANDSET "C" IN CONVERSATION WITH HANDSET "B". HANDSET "B" NEEDS TO PUT "C" ON HOLD.
S.1078
HOLD REQUEST RECEIVED ?
N
Y
REQUEST REFUSED
S.1080
CALL REQUEST RECEIVED ?
N
S.1082
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING LISTENING FOR QUERIES
Y
S.1084
REQUEST FROM "B" ?
N
S.1086
ACCEPT CALL REQUEST FROM THAT HANDSET AS RECIPIENT
Y
S.1088
NEGOTIATE CHANNEL (WITH "B") AS RECEIVING PARTY
S.1090
INITIATE CONVERSATION WITH "B"
S.1092
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING LISTENING FOR QUERIES

FIG. 34

FIG. 35

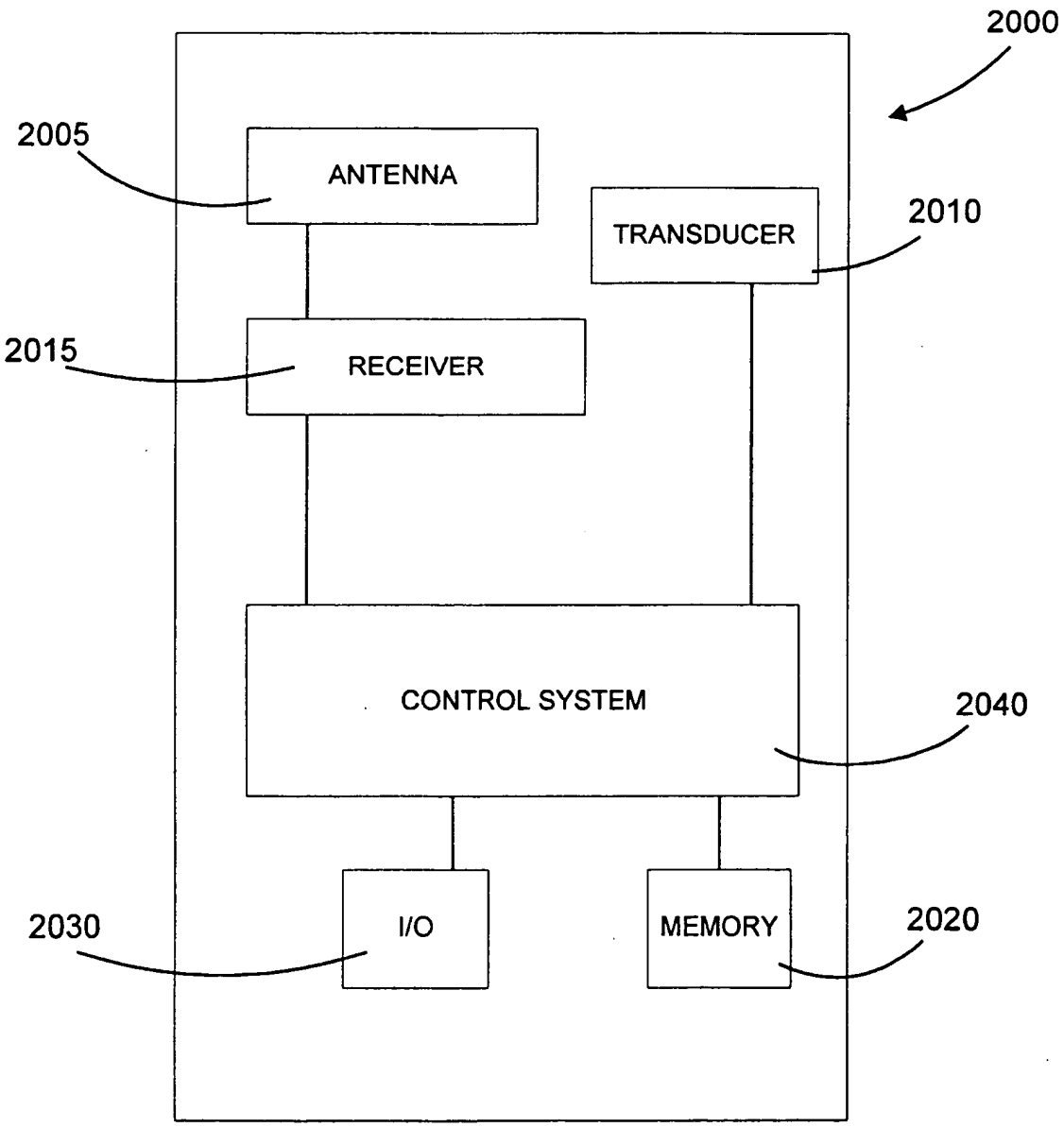
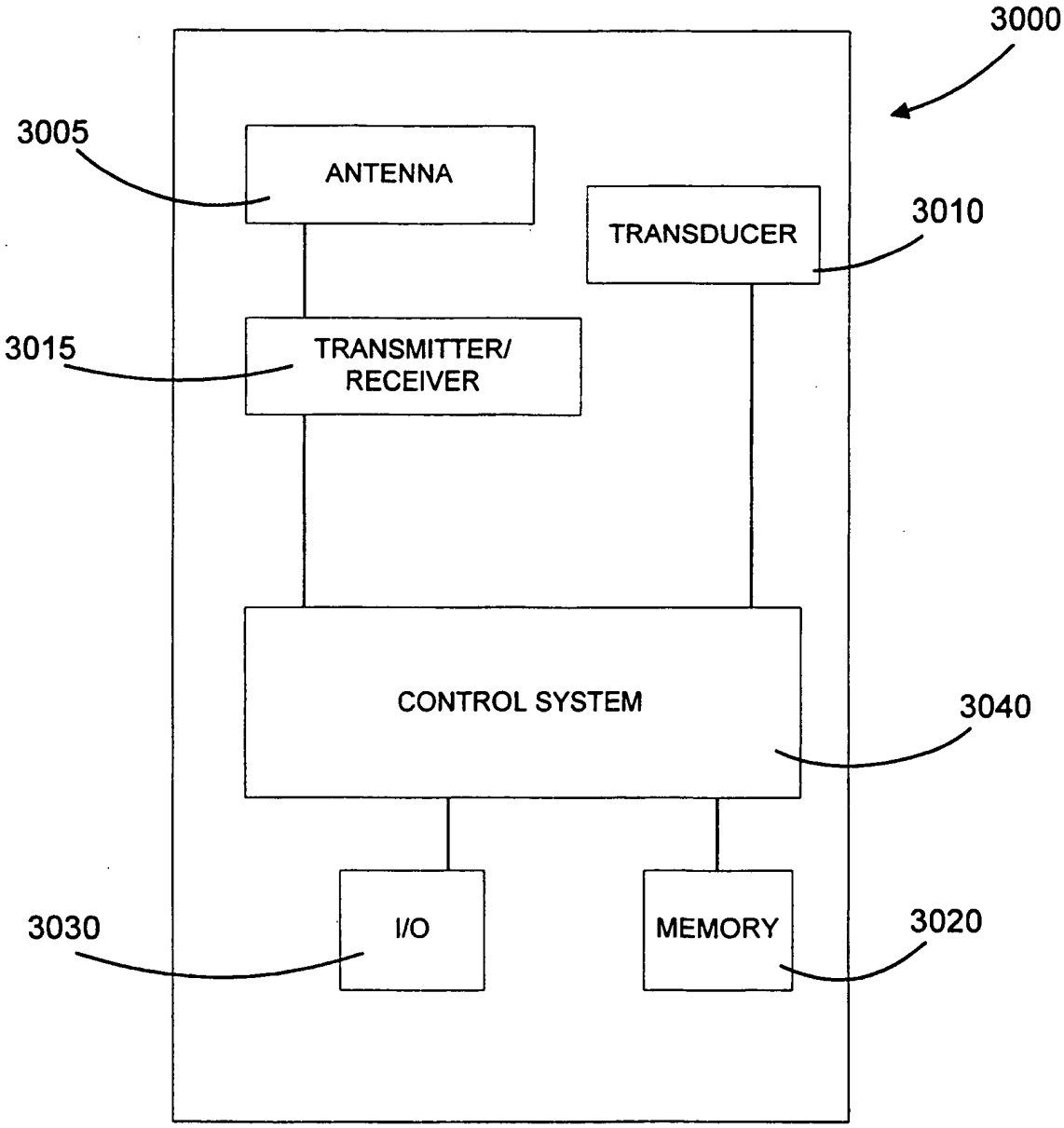

2000
2005
ANTENNA
TRANSDUCER
2010
2015
RECEIVER
CONTROL SYSTEM
2040
2030
I/O
MEMORY
2020

FIG. 36


3000
3005
ANTENNA
TRANSDUCER
3010
3015
TRANSMITTER/
RECEIVER
CONTROL SYSTEM
3040
3030
I/O
MEMORY
3020

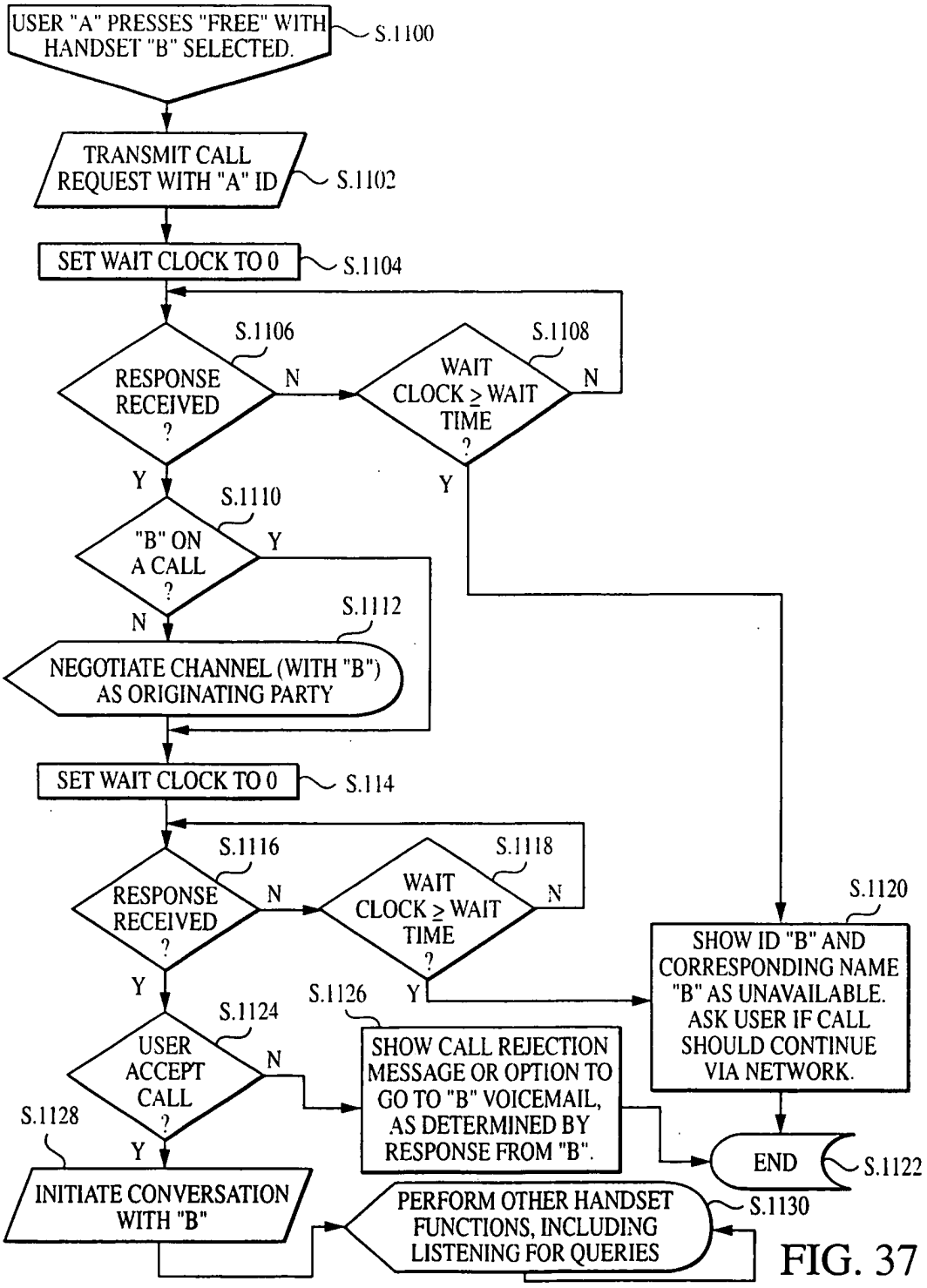

USER "A" PRESSES "FREE" WITH HANDSET "B" SELECTED.
S.1100
TRANSMIT CALL REQUEST WITH "A" ID
S.1102
SET WAIT CLOCK TO 0
S.1104
S.1106
RESPONSE RECEIVED ?
N
S.1108
WAIT CLOCK ≥ WAIT TIME ?
N
Y
Y
S.1110
"B" ON A CALL ?
Y
N
S.1112
NEGOTIATE CHANNEL (WITH "B") AS ORIGINATING PARTY
SET WAIT CLOCK TO 0
S.114
S.1116
RESPONSE RECEIVED ?
N
S.1118
WAIT CLOCK ≥ WAIT TIME ?
N
Y
Y
S.1120
SHOW ID "B" AND CORRESPONDING NAME "B" AS UNAVAILABLE. ASK USER IF CALL SHOULD CONTINUE VIA NETWORK.
S.1126
S.1124
USER ACCEPT CALL ?
N
SHOW CALL REJECTION MESSAGE OR OPTION TO GO TO "B" VOICEMAIL, AS DETERMINED BY RESPONSE FROM "B".
S.1128
Y
END
S.1122
INITIATE CONVERSATION WITH "B"
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING LISTENING FOR QUERIES
S.1130

FIG. 37

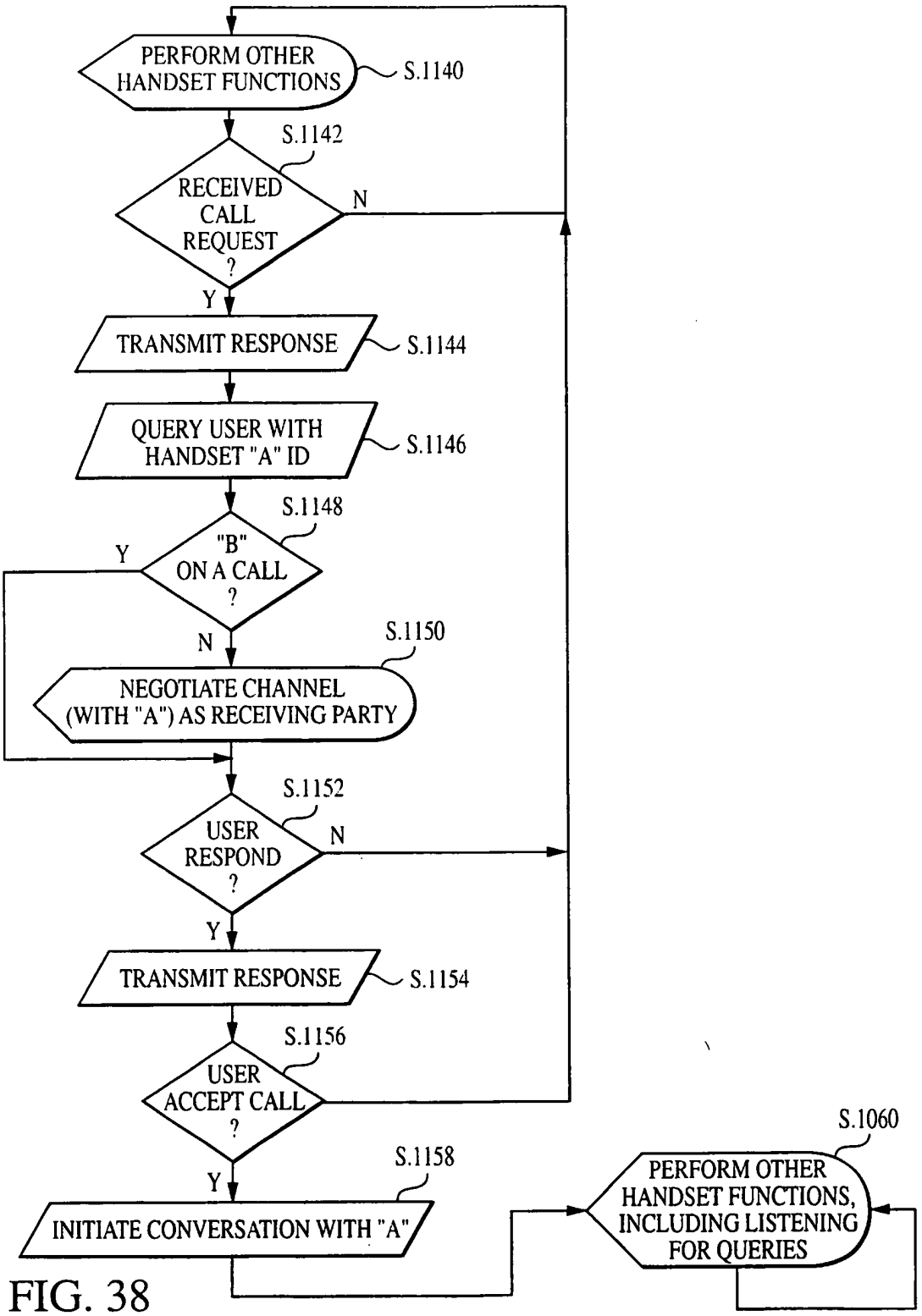

PERFORM OTHER HANDSET FUNCTIONS
S.1140
S.1142
RECEIVED CALL REQUEST ?
N
Y
TRANSMIT RESPONSE
S.1144
QUERY USER WITH HANDSET "A" ID
S.1146
S.1148
"B" ON A CALL ?
Y
N
S.1150
NEGOTIATE CHANNEL (WITH "A") AS RECEIVING PARTY
S.1152
USER RESPOND ?
N
Y
TRANSMIT RESPONSE
S.1154
S.1156
USER ACCEPT CALL ?
Y
S.1158
INITIATE CONVERSATION WITH "A"
S.1060
PERFORM OTHER HANDSET FUNCTIONS, INCLUDING LISTENING FOR QUERIES

FIG. 38

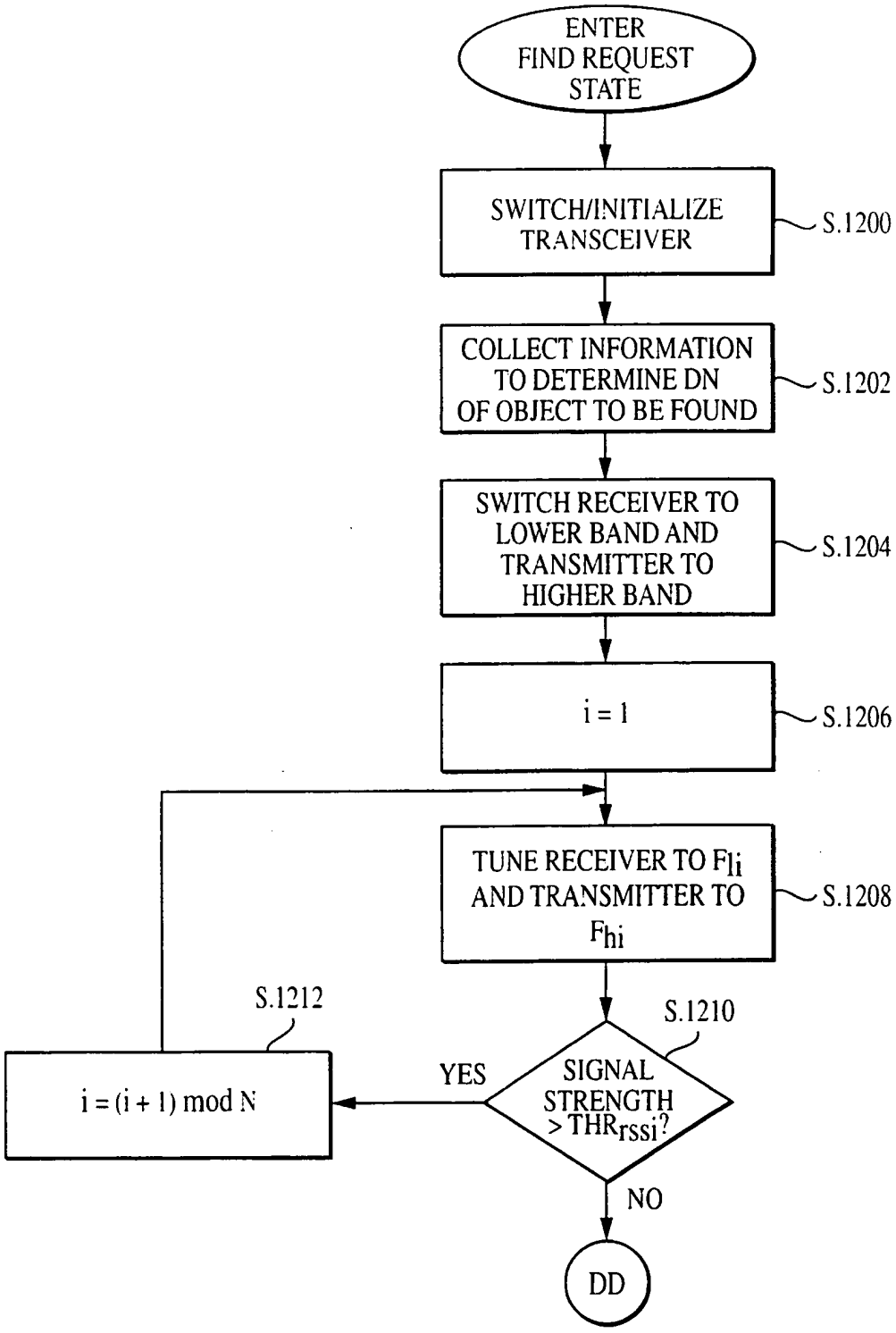

ENTER FIND REQUEST STATE
SWITCH/INITIALIZE TRANSCEIVER
S.1200
COLLECT INFORMATION TO DETERMINE DN OF OBJECT TO BE FOUND
S.1202
SWITCH RECEIVER TO LOWER BAND AND TRANSMITTER TO HIGHER BAND
S.1204
i = 1
S.1206
TUNE RECEIVER TO F_{li} AND TRANSMITTER TO F_{hi}
S.1208
S.1210
SIGNAL STRENGTH > THR_{rssi}?
YES
NO
S.1212
i = (i + 1) mod N
DD

FIG. 39A

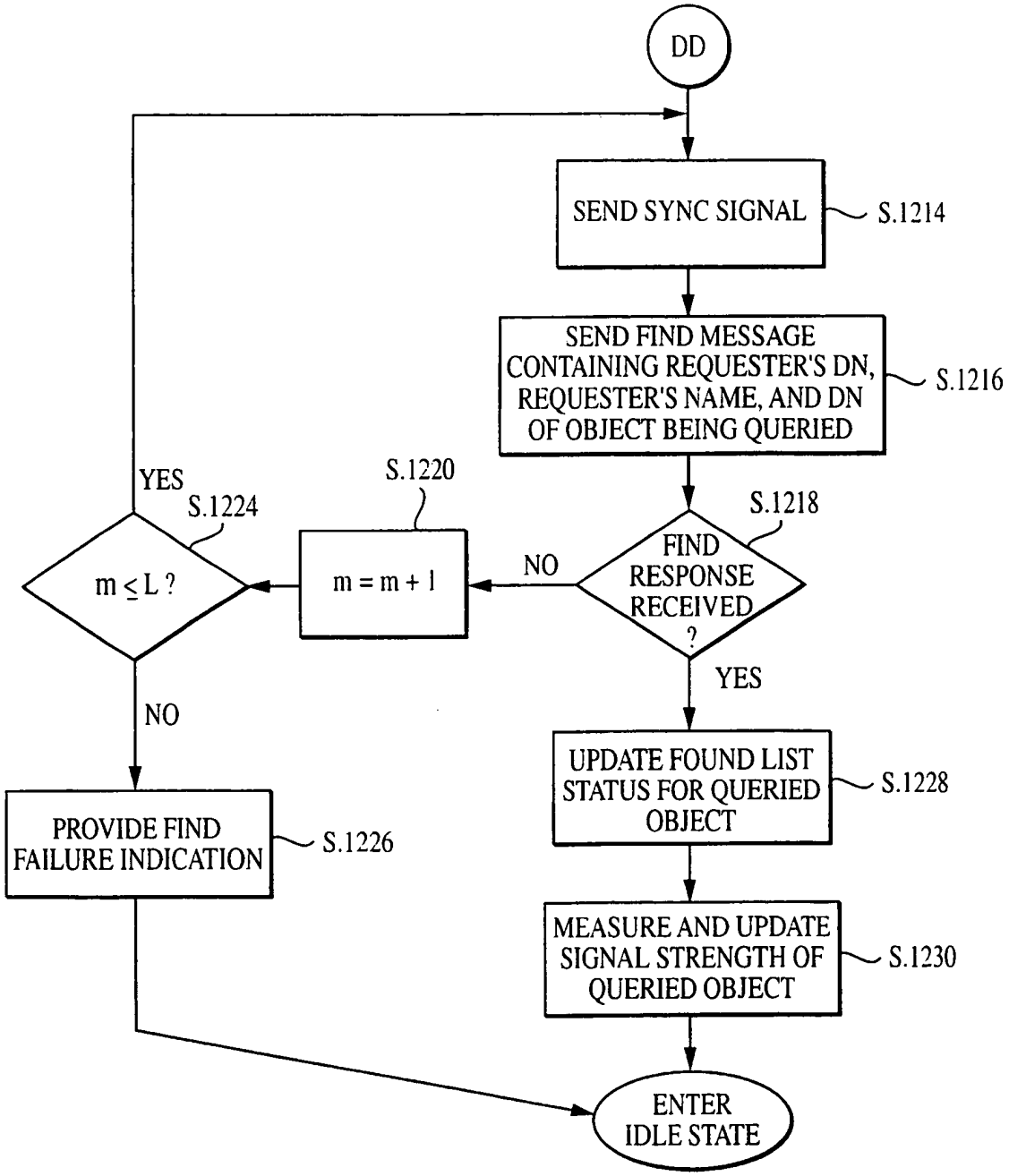

DD
SEND SYNC SIGNAL
S.1214
SEND FIND MESSAGE CONTAINING REQUESTER'S DN, REQUESTER'S NAME, AND DN OF OBJECT BEING QUERIED
S.1216
S.1218
FIND RESPONSE RECEIVED ?
NO
S.1220
m = m + 1
m ≤ L ?
S.1224
YES
NO
YES
PROVIDE FIND FAILURE INDICATION
S.1226
UPDATE FOUND LIST STATUS FOR QUERIED OBJECT
S.1228
MEASURE AND UPDATE SIGNAL STRENGTH OF QUERIED OBJECT
S.1230
ENTER IDLE STATE

FIG. 39B

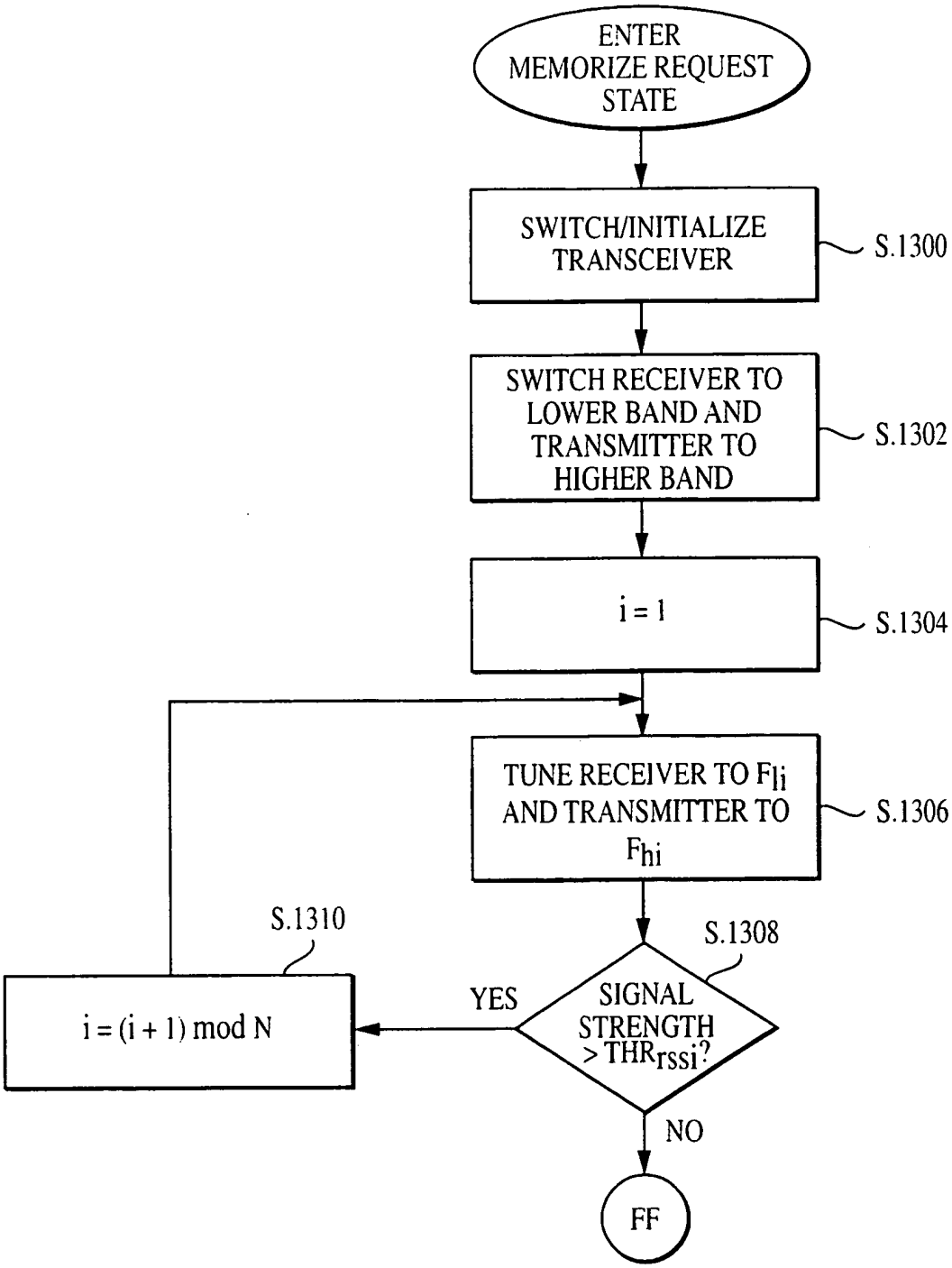

ENTER MEMORIZE REQUEST STATE
SWITCH/INITIALIZE TRANSCEIVER
S.1300
SWITCH RECEIVER TO LOWER BAND AND TRANSMITTER TO HIGHER BAND
S.1302
i = 1
S.1304
TUNE RECEIVER TO Fli AND TRANSMITTER TO Fhi
S.1306
S.1308
SIGNAL STRENGTH > THRrssi?
YES
NO
S.1310
i = (i + 1) mod N
FF

FIG. 40A

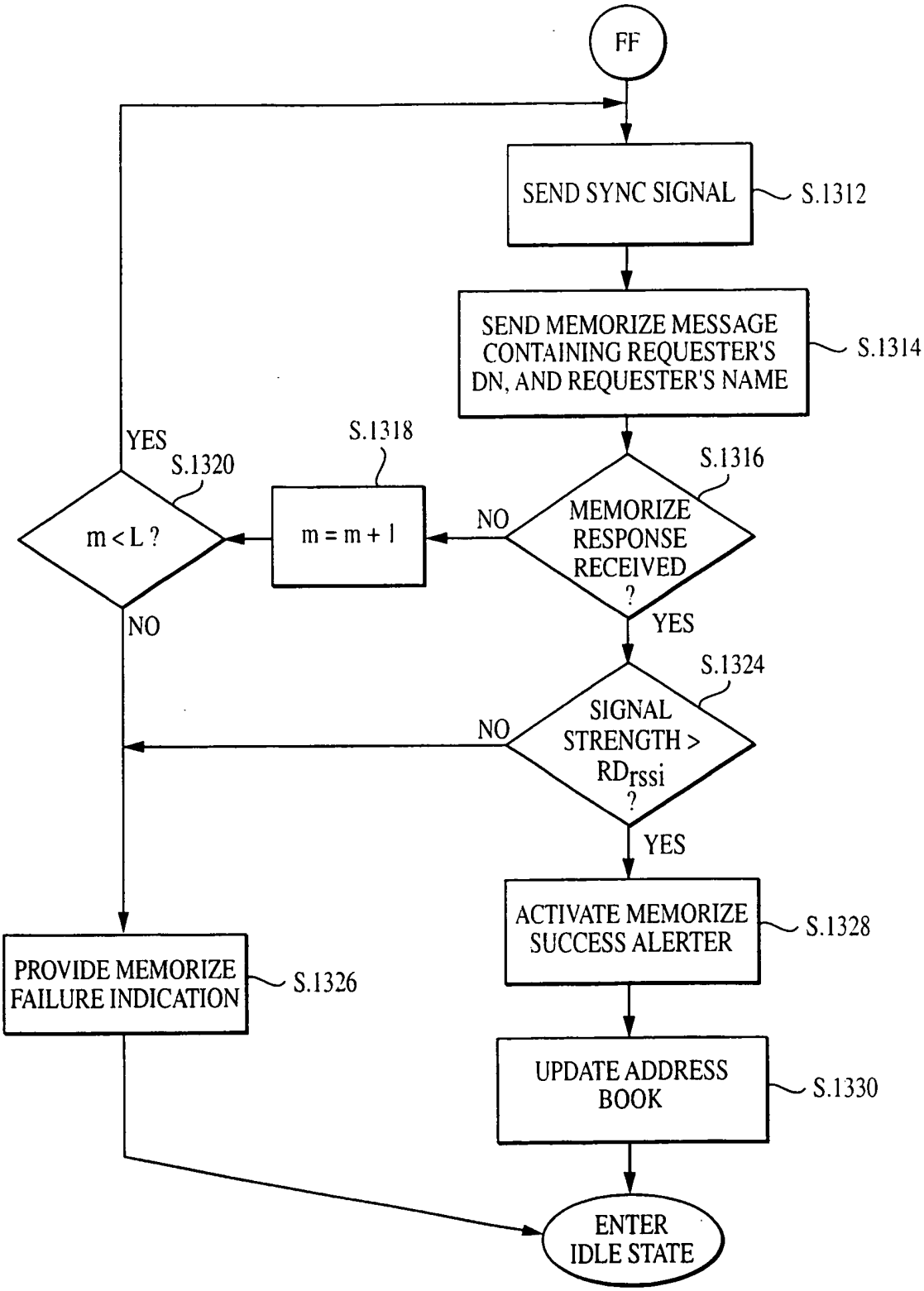

FF
SEND SYNC SIGNAL
S.1312
SEND MEMORIZE MESSAGE CONTAINING REQUESTER'S DN, AND REQUESTER'S NAME
S.1314
S.1316
MEMORIZE RESPONSE RECEIVED ?
NO
S.1318
m = m + 1
S.1320
m < L ?
YES
NO
YES
S.1324
SIGNAL STRENGTH > RDrssi ?
NO
YES
ACTIVATE MEMORIZE SUCCESS ALERTER
S.1328
PROVIDE MEMORIZE FAILURE INDICATION
S.1326
UPDATE ADDRESS BOOK
S.1330
ENTER IDLE STATE

FIG. 40B

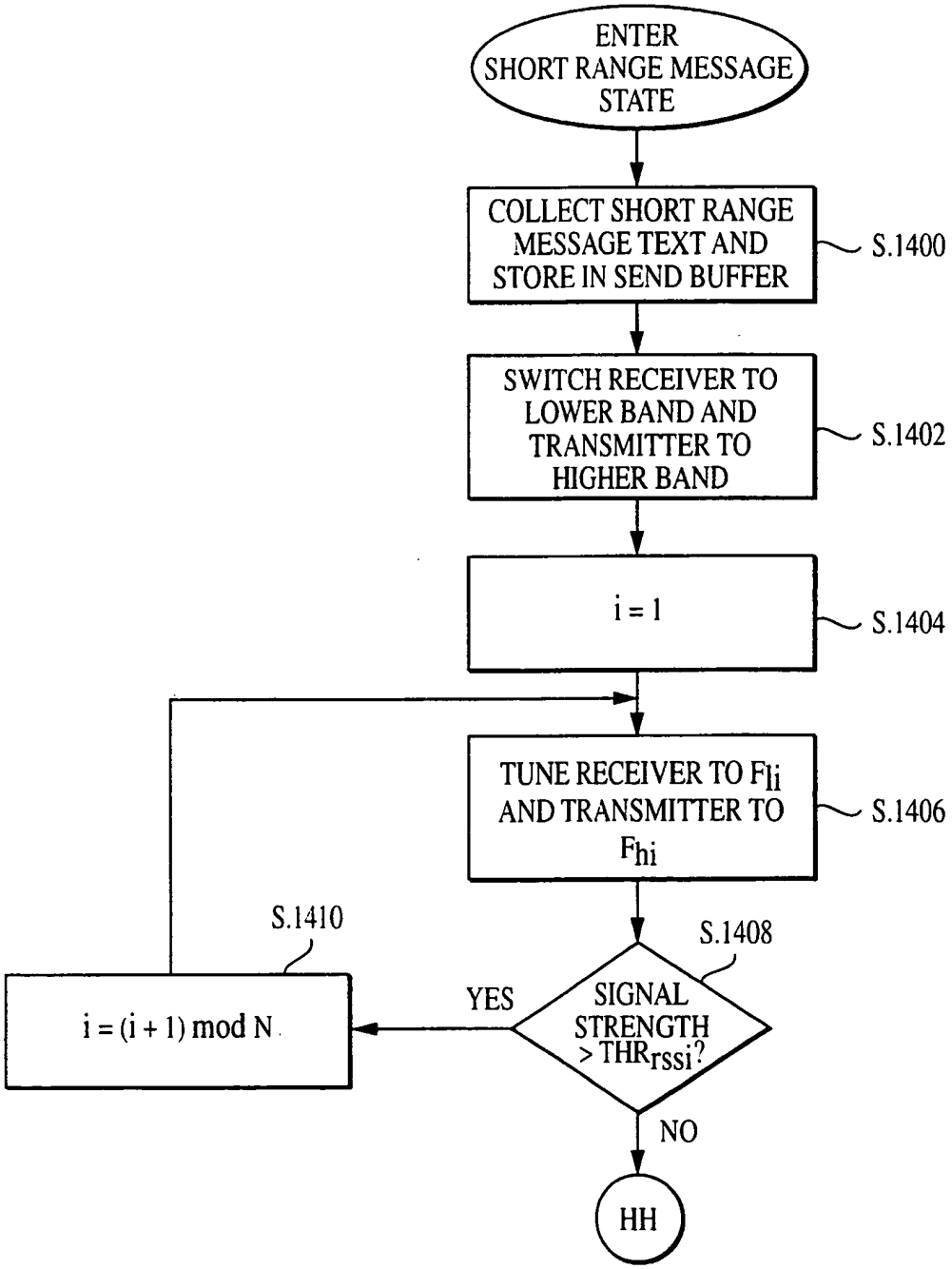

ENTER SHORT RANGE MESSAGE STATE
COLLECT SHORT RANGE MESSAGE TEXT AND STORE IN SEND BUFFER
S.1400
SWITCH RECEIVER TO LOWER BAND AND TRANSMITTER TO HIGHER BAND
S.1402
i = 1
S.1404
TUNE RECEIVER TO Fli AND TRANSMITTER TO Fhi
S.1406
S.1408
SIGNAL STRENGTH > THRrssi?
YES
NO
S.1410
i = (i + 1) mod N
HH

FIG. 41A

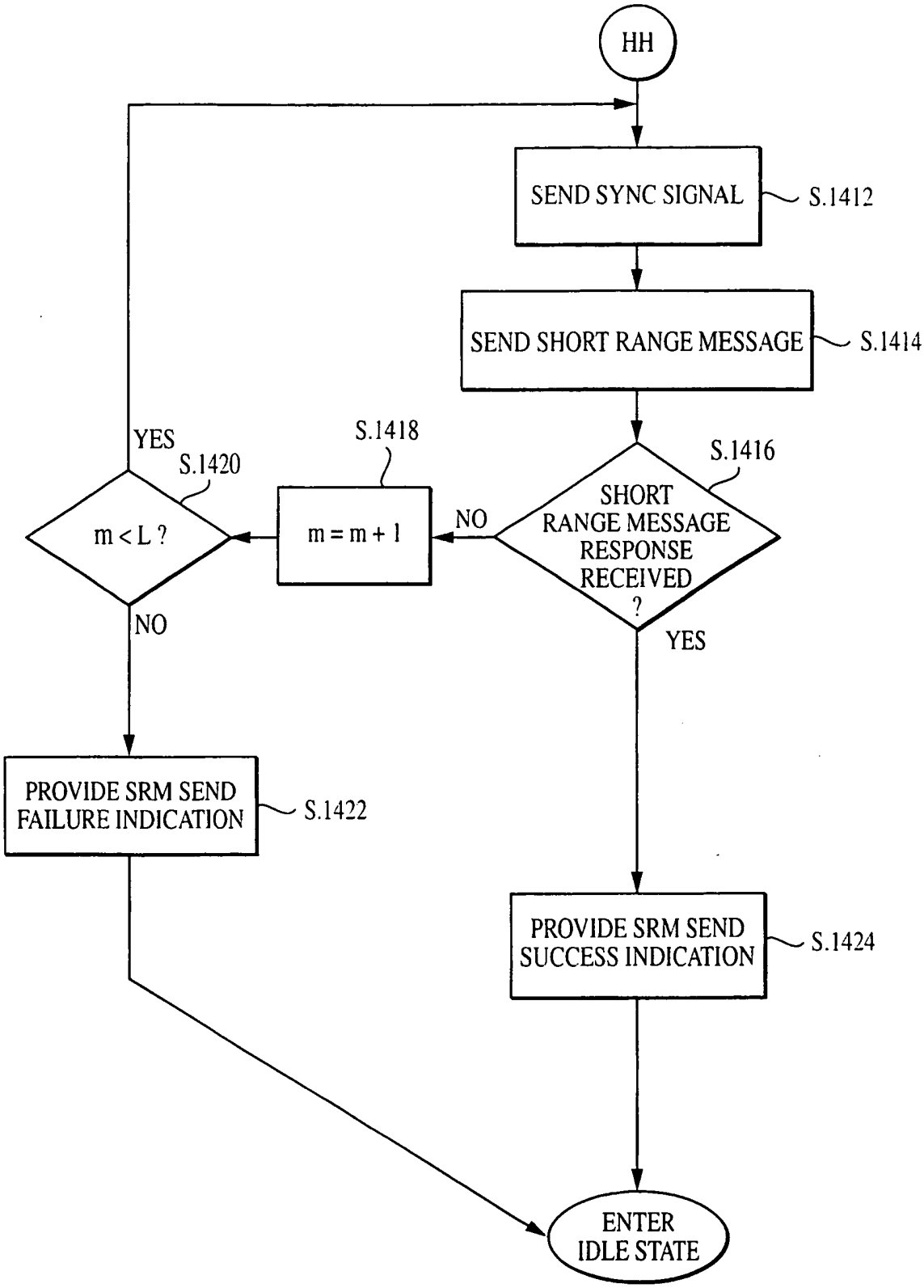

HH
SEND SYNC SIGNAL
S.1412
SEND SHORT RANGE MESSAGE
S.1414
S.1416
SHORT RANGE MESSAGE RESPONSE RECEIVED ?
YES
NO
S.1418
m = m + 1
S.1420
m < L ?
YES
NO
PROVIDE SRM SEND FAILURE INDICATION
S.1422
PROVIDE SRM SEND SUCCESS INDICATION
S.1424
ENTER IDLE STATE

FIG. 41B